

MAY 14, 1914

10¢ A COPY

MOTOR AGE



Table

Listen to What DAVID L. GALLUP Says About Brake Lining

We print herewith an extract from Prof. Gallup's report at the conclusion of a series of tests made of different brands of brake lining. Five samples were submitted—the five which are most widely used in the industry. Prof. Gallup's report is in part as follows:—

"In carrying out these tests all the samples of brake lining were subjected to exactly the same treatment, the conditions chosen being, as nearly as possible, such as are met with in actual practice. The tests were conducted with the object of determining the characteristics of various samples with particular reference to—

- No. 1 Braking Ability (Frictional Quality)
- No. 2 Heat Resistance
- No. 3 Wearing Qualities } (Durability)
- No. 4 Effect of wear and heat upon the braking ability

After a careful examination of the brake linings upon the completion of these tests, and an analysis of the results obtained, it is evident that MULTIBESTOS stands superior to the other brake linings tested with particular reference to the following points:—

Braking ability under all conditions of service
Durability
Resistance to effect from heat"

(Signed)

David L. Gallup



DAVID L. GALLUP, M. E.

PROFESSOR GAS ENGINEERING, WORCESTER POLYTECHNIC
INSTITUTE, AND IN CHARGE OF AUTOMOBILE
TESTING LABORATORY.

Standard Woven Fabric Co.
FRAMINGHAM, MASS.

BOSTON, 903 Boylston St. PHILADELPHIA,
NEW YORK, 276 Canal St. 1427 Vine Street.
CHICAGO, 1430 Michigan SAN FRANCISCO,
Boulevard. corner First and
Howard Streets.





500-mile International Sweepstakes Race, Indianapolis Motor Speedway, May 30, 1912. Time 6:21:06. Average 42.22 miles per hour, setting record by 4.11 miles per hour. Actual running time 51.72 miles per hour.

SIX—\$2375

National

The one and only American-made car that remains superior to all foreign cars in the International 500-mile race is the *National*.

— *National* ... 6:21:06, winner in 1912
 Flat ... 6:31:29, second in 1912
 Peugeot ... 6:35:05, winner in 1913
 (The *National* was not entered in 1913)

The *National* won, and has held for years, the world's stock car championship. The *National* also holds the world's record for the fastest average straight-away mileage with a stock car, 89.28.

Its History and Its Today Warrant Your Confidence

The International 500-mile race is again scheduled for May 30, on the famous Speedway at Indianapolis.

The Unconquered *National*

Against a background of three years' struggles the *National* stands with silhouette distinctness. It is the record-maker, the record-holder, the unconquered. You may or may not believe in racing. You must admit that a car must have great and genuine *quality* to win and remain The World's Champion as the *National* has. The *National* was not entered last year. (A foreign car won, but did not equal the *National's* record.) The *National* will not enter this year. The *National* need not fight its own unblemished record.

NATIONAL FORTY TOURING CAR Write for illustrated race books or illustrated catalogs

"You don't have to Raise the Hood"

National owners know that when the *National* builders put their guarantee behind the car it is *right*. We have no secrets. We invite you to visit our factories and inspect and analyze our cars and our methods. But we do say with all our might that the biggest consideration in buying a car today is to purchase *performance* and not specifications. We take the responsibility for the mechanical parts of our car—as we *should*.

We put the right material in the correct place. We sell you our responsibility, our reputation, our ability and our guarantee—not a mere collection of wheels, axles, gears, etc.

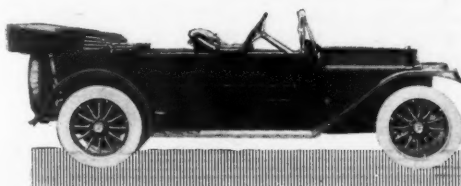
If there isn't a *National* dealer near you, please write us for address of the

nearest one. Ask us for our booklets. Post yourself—*know* the *National*. And to know it is to want to own it. Write today.

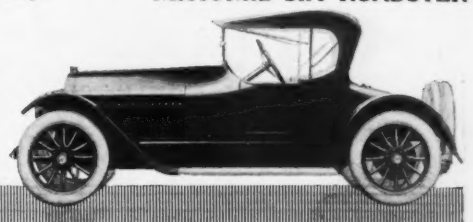
National Forty This is our staple car. Five models, \$2750 to \$3400, with still further improvements and refinements. Motor 4 $\frac{7}{8}$ x6; electric lights and starter; a most luxurious and dependable car—The World's Champion.

National Six This new Six is beautiful, graceful in design; the most convenient, noiseless. Motor 3 $\frac{3}{4}$ x5 $\frac{1}{2}$; 132-inch wheelbase; electric starter and lights; left-side drive, center control; complete in every detail, full equipment.

NATIONAL SIX ROADSTER



National Motor Vehicle Co.
 DEPT. S, INDIANAPOLIS, IND.



When Writing to Advertisers, Please Mention Motor Age.

Rough Road Relief

The efficiency of the modern automobile makes touring ideal except for one thing—rough roads. It is possible, nevertheless, to get absolute immunity from the jolts and jars of rough roads by equipping your car with the new Automatic

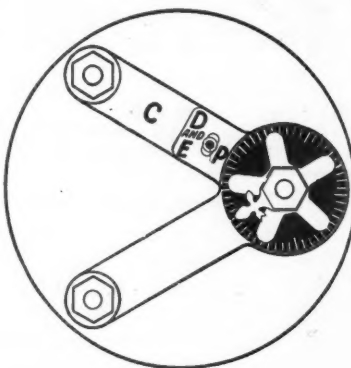
Truffault-Hartford **SHOCK ABSORBER** *"The Pioneer and the Best"*

Spring touring days are here. By making "Every Road a Boulevard," Truffault-Hartfords will lend a new charm to your enjoyment by giving you constant comfort. But that is only one of many benefits.

By eliminating violent spring-action, your car is kept on the ground, saving both springs and tires. By absorbing all jolt, jar and vibration, the engine and parts are saved unnecessary strain. This

means greatly reduced upkeep cost.

If this ideal combination of comfort and economy sounds too good to be true, remember that over a quarter-million car owners are using Truffault-Hartfords—twenty-five leading manufacturers have adopted them as a part of regular factory equipment—and finally, that absolutely satisfactory results are guaranteed.



PRICES—FOUR MODELS
\$60 \$50 \$35 \$16

HARTFORD SUSPENSION CO.

E. V. HARTFORD, Pres.

Main Office and Works: 146 Bay St., Jersey City, N. J.

Manufacturers of Hartford Electric Starting and Lighting System

BRANCHES

NEW YORK—212-214 West 88th St.

BOSTON—319-325 Columbus Ave.

CHICAGO—2637 Michigan Ave.

JERSEY CITY—141-143 Morgan St.

INDIANAPOLIS—425 No. Capitol Blvd.

DISTRIBUTORS

Chanslor & Lyon Co.
San Francisco
Seattle
Spokane

Los Angeles
Portland
Fresno
Oakland

Rheinhard Bros. Co.,
Minneapolis, Minn.
John Millen & Son, Ltd.
Montreal
Toronto
Winnipeg
Vancouver
Victoria

Fisk Co. of Texas—Dallas, Houston, San Antonio.
Coughlin & Davis, Cincinnati, O.

L. Mastrangel & Co., 117 So. Beatty St., Pittsburgh, Pa.

Pennsylvania Rubber & Supply Co., Cleveland, O.

Burnet & Chandler, 311 Halsey St., Newark, N. J.

Truffault-Hartford Agency, 1437 Vine St., Philadelphia, Pa.

Auto Accessory & Speedometer Co., Denver, Colo.

Charles Rubel & Co., 1312 Fourteenth St., N. W., Washington, D. C.

Truffault-Hartford Agency, 1803 Grand Ave., Kansas City, Mo.



MOTOR AGE

Published by the
CLASS JOURNAL COMPANY
910 South Michigan Avenue
CHICAGO ILLINOIS

YEARLY SUBSCRIPTION RATES

United States, Mexico and U. S. Possessions.....\$3.00
Canada and all Foreign Countries..... 5.00

All currency should be sent by registered mail.

Two weeks should be allowed for change of address to become effective, or for receipt of first copy on a new subscription.

In forwarding change of address, please give old and new address.

BEWARE OF SOLICITORS OFFERING SUBSCRIPTIONS AT CUT RATES.

Volume XXV

MAY 14, 1914

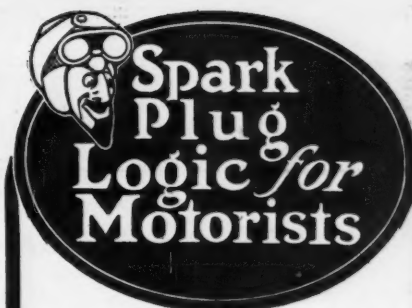
No. 20

Contents

HISTORY-MAKING RACING CARS.....	5
Conclusion of article dealing with speed performances, touching largely upon the machines of the present generation	
LITTLE FRENCH CARS SHOW FUEL ECONOMY.....	12
Remarkable results in 2000-mile road test—Best performance 42.4 miles per gallon	
BOTH ROAD RACES AWARDED TO 'FRISCO.....	13
Vanderbilt and grand prix will be featured at Panama-Pacific exposition	
EDITORIAL—RACING AS A BUSINESS—ENCOURAGING TOURING..	14
SAXON COMPLETES 30-DAY ROAD TEST.....	15
Little car runs 135 miles per day for a month in Detroit	
FIRST OF FOREIGNERS CHECK IN AT SPEEDWAY.....	16
Goux and Boillot reach Indianapolis—Disbrow to drive for Burman—Harroun may be in race	
FACTORY CONDITIONS IN DETROIT.....	18
All plants operated at capacity and half of them running overtime—Situation in Moline, St. Louis, Racine and Kenosha	
EXPORTS AND IMPORTS FOR LAST MARCH.....	23
Shipments abroad increase in value	
BUYERS OF KNOX FORM NEW COMPANY.....	24
Sutton interests to make fresh start—Velvet shock absorber makers given decision over J. M.	
SPECIAL FORD FITMENTS.....	32
Accessories made for the Ford car	
INDEX TO ADVERTISEMENTS.....	118

DEPARTMENTS

Routes and Touring Information	26	Coming Motor Events.....	40
Readers' Clearing House.....	30	Among Makers and Dealers....	41
The Accessory Corner.....	38	Recent Incorporations.....	41
From the Four Winds.....	40	Brief Business Announcements..	42



THE efficiency of a motor can be made or marred by the spark plugs used. Bosch Plugs are the right plugs for every motor. There are scientific reasons why they are right. Here are four of them:

1. The intense heat of ignition sparks will burn away soft spark plug points. That is why the points or electrodes of cheap plugs fail to last. Bosch Plugs have especially heavy, nickel electrodes that persist in withstanding the intense heat. That is why the 1914 Grand Prize and Vanderbilt Cup Race winners used Bosch Plugs.

2. Bosch electrodes are not pointed; because pointed types make a thin, streaky spark and burn away quickly. Bosch electrodes are crescent shape and have a knife edge that provides a ready path for the electric current and makes starting easy. For a quick get-away use Bosch Plugs.

3. The exclusive, crescent shaped electrode forms the spark into a ribbon of flame, igniting a larger number of gas particles than any other form of electrode. That is why Bosch Plugs give new life to engines not previously Bosch-Equipt.

4. Bosch Plugs give satisfaction without continual adjustment because they have three electrodes, which are not too many nor too few (see illustration). The spark jumps the gap offering the least resistance. When this gap grows wider the spark automatically passes to the next, and so on. That is why successful long engine tests are those made with Bosch Plugs.

Perhaps your car is not efficient, perhaps it needs new plugs. Try a set of Bosch Plugs, the same as those used

by all high grade cars, such as the Peerless, Pierce-Arrow, Mercer, Garford, Speedwell, Jeffery, Velie, Marmon, Case, Stutz, Moline-Knight, Lozier, etc.



Bosch Plugs can be bought for \$1.00 each from your dealer, Bosch Service Stations, or direct.

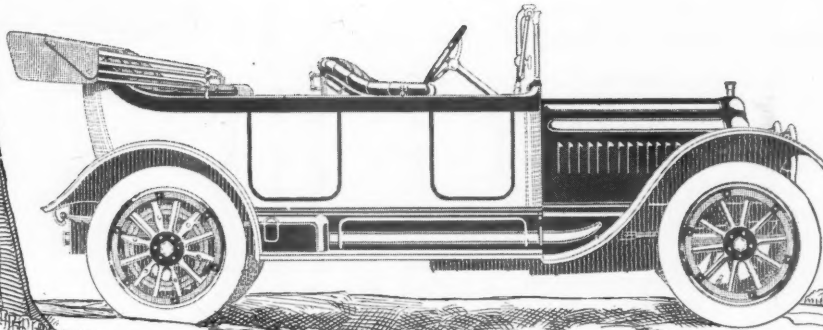
Write for "Locating the Spark Plug," sent free to any motorist upon request.

Bosch Magneto Co.

214 West 46th St.,

New York





Unity

In White Cars the perfect relation of every working part to the other, -the harmonious proportion of all, gives a lasting satisfaction found in no other car. The day is past when a car can long exist because of one or two much extolled features. The beauty and usefulness of White Cars endure, because they are designed and built in the White Factory as a consistent unit.

THE WHITE  COMPANY
CLEVELAND

~Otto Cushing~

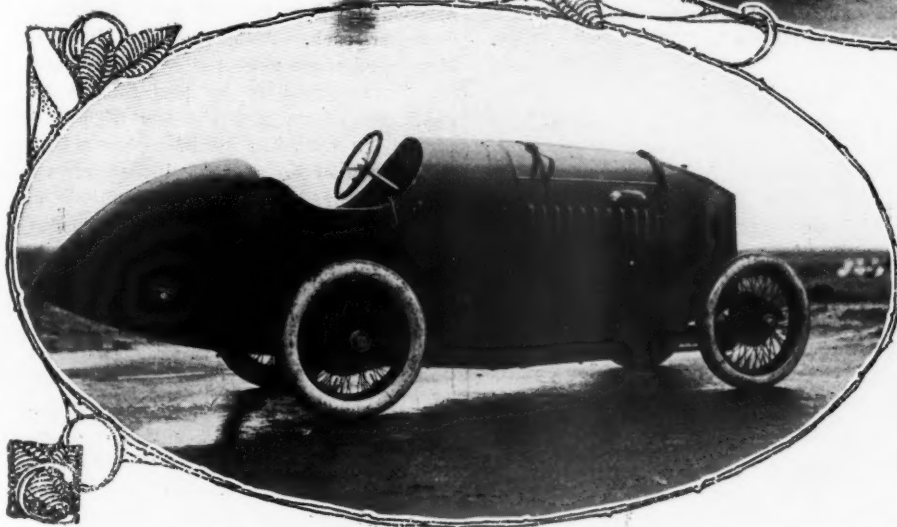
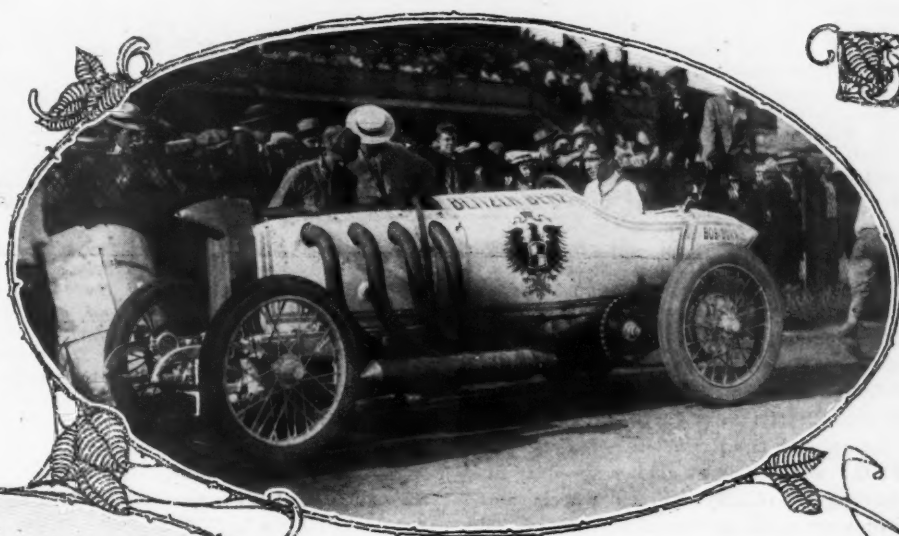
Mercury discards his winged sandals for the White Six

MOTOR AGE

History-Making Racing Cars *What They Did and How They Did It* By Darwin S. Hatch

EDITOR'S NOTE—This is the second and concluding installment of the article dealing with racing cars that have made good. In this chapter the more modern speed creations are taken up and we learn of the feats of the de Palma Mercedes, the Blitzen Benz, the Duray Fiat, the Cooper Stutz, the Dawson National, Harroun Marmon, Mulford Lozier and others that have earned their niches in the hall of fame.

WHAT is undoubtedly the oldest racing car now in active service is the Fiat Cyclone. Originally it was built for Cedrino and campaigned by him until he was killed at Baltimore, then Ralph de Palma took it and used it. With Cedrino at the wheel, this car, which was credited with 120 horsepower, won the 100-mile race



Here we find the Blitzen Benz and the Duray Fiat which have won their spurs in straightaway time trials. The Blitzen Benz, shown above, first with Oldfield and then Burman at the wheel, traveled at record-breaking clips over the Ormond sands, only to have its honors taken away by the giant Fiat which recently went a kilometer at the rate of 142.9 miles per hour at Ostend

for the Minneapolis cup at the 1908 Ormond beach meet. It was also responsible for the death of Louis Meneghetti, the South American speed king, last year. It has a displacement of 600 cubic inches and in its day was very speedy. It is now in the hands of a Richmond, Va., motorist and

is for sale, it is understood, for \$500. How have the mighty fallen!

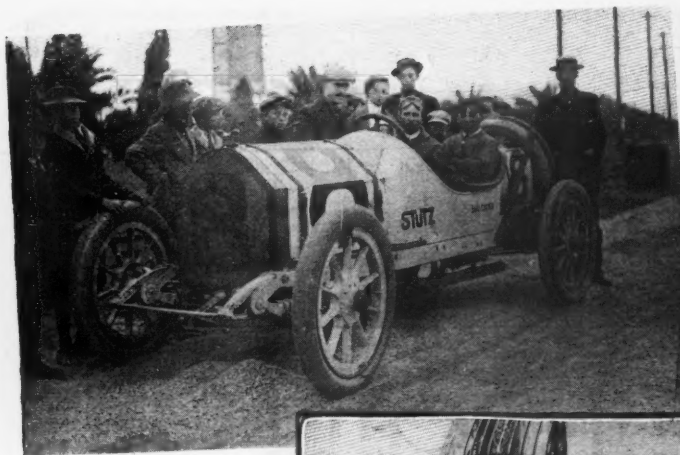
The name, Fiat Cyclone, also was given to a similar car of somewhat later model, used by Ralph de Palma in dirt track work, during which time he set a new 1-mile record, taking it away from Barney

Oldfield. This was the beginning of a speed duel between Oldfield and de Palma which is yet to be settled and a rivalry which was only added to by de Palma's winning over Oldfield at Santa Monica this spring. The second Fiat Cyclone is now owned by the Fiat company.

Simplex Zip Still Active

A car which was brought out to compete with the Fiat Cyclone and at about the same time and one which still is in active track service is the Simplex Zip. Originally it was built for George Robertson, who drove it at Oakland and the Los Angeles 1-mile board track. It is now owned by Louis Disbrow and is being campaigned steadily.

A car which had the eyes of the world upon it and the hopes of the nation bound up in it for 10 months, was the old Thomas Flyer, the winner of the New York to Paris race, which left New York February, 1908, and won the race from the five German, French and Italian cars. So far as the car itself is concerned, it was a stock product taken from the floor of the now defunct Thomas company, with a standard 60-horsepower Thomas Flyer motor. The

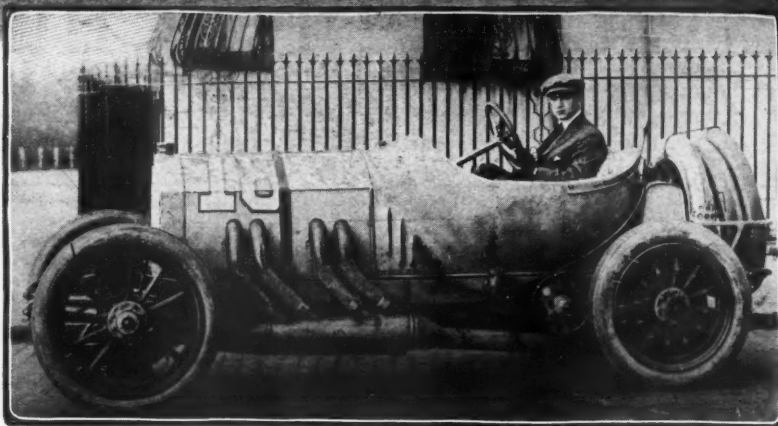


Earl Cooper and his Stutz won America's road racing championship in 1913. In this one car Cooper captured five consecutive firsts in as many hard-fought battles, a record never before achieved by any racing man. These were won at Santa Monica, Corona and Tacoma and the cars and men Cooper defeated included the best in the sport

car was driven by Montague Roberts, Miller and Schuster in the 20,000 mile trip and was fitted out under the former's supervision at the Buffalo factory.

Thomas Details

Its special equipment for the world tour at racing speed is interesting. Ordinary 36-inch wheels and tires were used on the early part of the journey; later these were changed to 40-inch wheels with solid tires, so designed that should the rubber have worn out, the machine could have run on the steel rims. Spare tires were carried behind the rumble seat. Running the full length of the car, and each side of the vehicle, was a long wooden support to which parts of the equipment were attached, and which served to work over rough roads. Ninety gallons of gasoline were carried in the ordinary tank. A winch was fitted to the front of the car and connected to the engine by coupling gears. Provision was made for warming the driver by means of the exhaust gases, and protection was afforded the men by windshield and



No other car has been so successful in a racing way as Ralph de Palma's old Mercedes. In 1912 it ran in the 500-mile race at Indianapolis, being put out with two more laps to go at a time when it was 15 miles to the good. Later that same year it won the Elgin National trophy and free-for-all and the Vanderbilt at Milwaukee and should have been second in the grand prize only for de Palma's accident on the last lap. It was in the money in last year's 500-mile race, Mulford driving, and at the Santa Monica meet this year it won the Vanderbilt and at one time was leading in the grand prize. Mulford is to drive the same car, fitted with a Peugeot motor, in this year's Indianapolis race

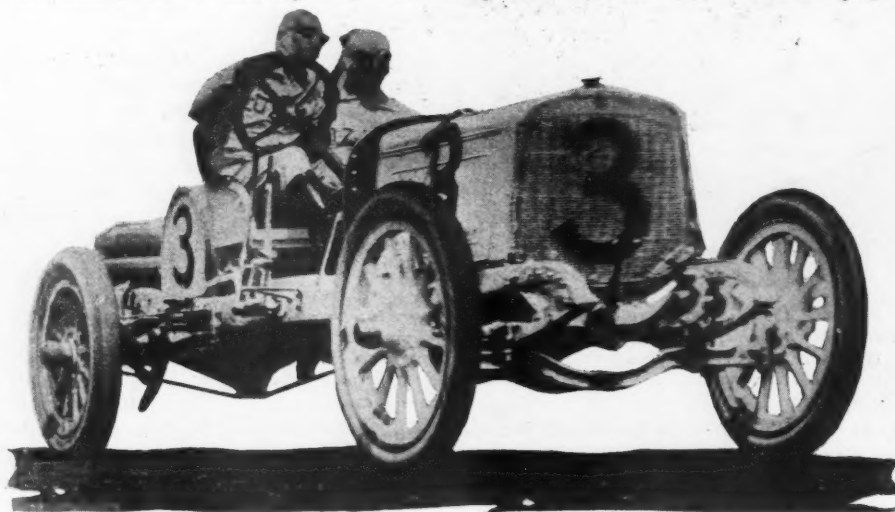
a buggy hood, rather a unique construction.

Savannah road races gave the Isottas a great deal of fame in this country in 1908. Lewis Strang, driving the 55-horsepower Isotta, won the 343-mile race for the Savannah Challenge trophy on the 17-mile circuit at a speed of 53.78 miles per hour. Up to the time it reached Savannah, its motor had not been turned over since leaving Italy and Strang had not driven

possible by the use of exceedingly large flat-seated valves measuring $3\frac{1}{2}$ inches in diameter each. Also assisting in this high-speed work were the extremely light pistons, rendered so by perforations beneath the rings, and the use of hollow connecting rods. The cylinders had a bore and stroke of 5.7 and 4.7 inches, respectively. Instead of using the double ignition outfit employed on all of the other

racers, only a single high-tension magneto outfit, with one set of plugs, was used, the plugs being carried horizontally in the intake valve chambers. In the clutch were fifty-one disks—twenty-five steel and twenty-six bronze.

Lytle's Apperson, which finished second, differed radically from the Isotta in that it used separately-cast cylinders with opposite valves and had a bore of $5\frac{1}{2}$



Ralph Mulford and the Lozier, shown above, won the road racing championship of 1910, its best race being the Elgin National, then the stock car championship. This race established Mulford in the hall of fame

The twelve-cylinder Sunbeam, of English manufacture, is the speed marvel of the present generation. At Brooklands it has shown that it can go as fast a pace as the tires will stand and among its achievements is the smashing of the 1-hour world's record, covering 107 miles 1,672 yards, which still stands as the best mark

this make of car before that time. The Isotta had a high-speed engine of four cylinders, cast in pairs with opposite valves.

When traveling on the course, its motor turned over at 1,800 revolutions per minute, which speed was made

inches and a stroke of 5 inches. While the Apperson cars did not use such large valves as the Isotta, they always had been known to be among the largest made use of in this country, and also were of the flat-seated type. The ignition employed was a double system, magneto and battery, with two sets of plugs, that for the magneto over the intake valves and the battery set over the exhaust valves. These cars had a wheelbase of 105½ inches, which assisted them not a little in making the turns.

The Jay-Eye-See, which now is owned by Louis Disbrow, really is the old Fiat that formerly was driven by Lewis Strang, in which Strang set up several records in Indianapolis just after the speedway had been resurfaced with brick in December, 1909. Later at Atlanta, Strang drove the same car. At one time its motor was the largest ever built. There are four cylinders cast in pairs with a bore of 9¾ inches and a stroke of 8½ inches. The valves are in the head operated by long rocker arms. A 1,000-pound weight is carried on the rear end to hold the car to the track. Since Disbrow has had it, he has remodeled the car and it looks like a veritable speed monster, making it very successful in dirt track exhibition work.

The champion car of them all, the car that has

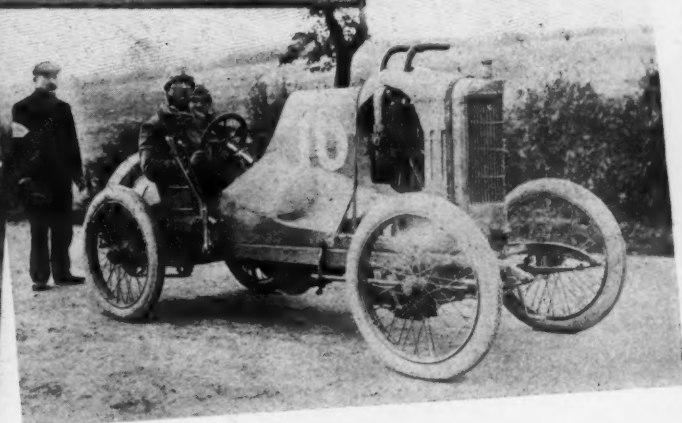
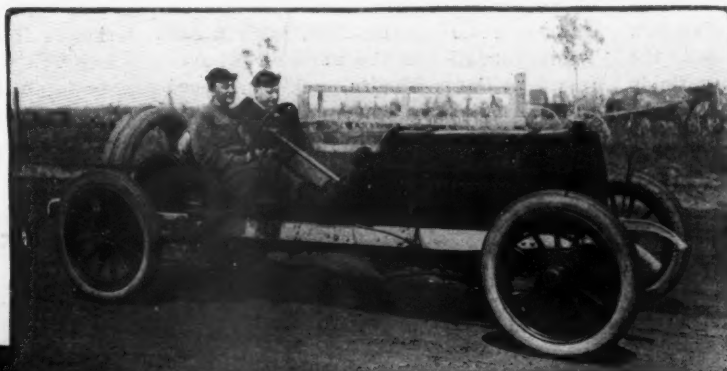


Here's the French Peugeot following its brilliant victory in the last 500-mile race at Indianapolis. Goux has pulled up at the pits and his mechanic is taking refreshments in a liquid form

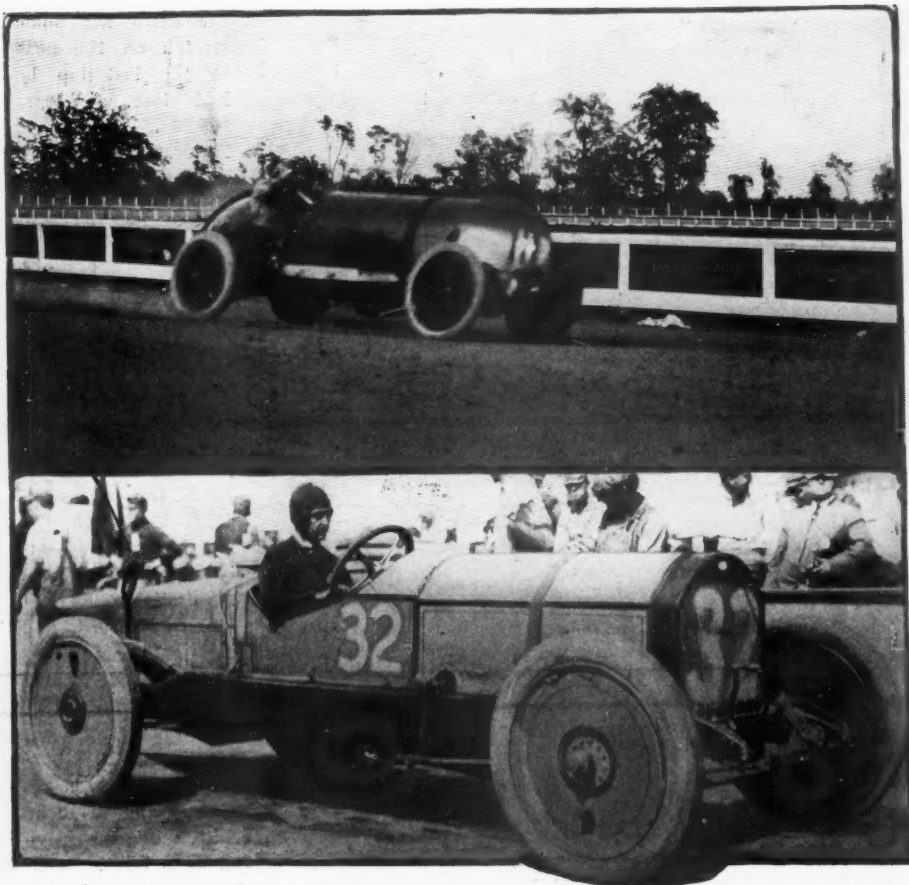
had more successes, more unlucky chances and more bruises, particularly in contests, than any other, is dePalma's old Mercedes. Little is to be learned of this veteran of the track and road race course before it appeared under dePalma's guidance in the 1912 speedway race at Indianapolis, in which he broke down while in the lead at an average of 81 miles per hour, and only two more laps of the 500 miles to go to pull down first prize money. When dePalma pushed his

money. Had he not carelessly run out of gasoline, he would have been at least second, and perhaps first in the 1913 500-mile race. Again the old Mercedes returned to dePalma's hands and in it he won the 1914 Vanderbilt, and also drove it in the grand prix 2 days later, finishing fourth after having once been in the lead.

Two different sets of cylinders were used on this car, one for events under 600 piston displacement class and another when it participated in races in which a limit of 450 cubic inches was set. For the 600 class, the four cylinders of the engine were 5 11-64 bore by 7 5-64 stroke. This gave a displacement of 595 cubic inches. The cylinders were cast in pairs and had all the valves in the head. The exhaust valves were



Grant's Alco, shown in the upper illustration, Robertson's Locomobile, shown in the left-hand illustration and Goux's one-cylinder Peugeot, in the right-hand corner, are three famous cars. The Alco was the first to win two consecutive Vanderbilts; Robertson's Locomobile was the first American car to win a Vanderbilt, while the little Peugeot distinguished itself in French road races. In the Normandie cup race in 1910 this car—one-cylinder, mind you—averaged 65.4 miles per hour for 209 miles



Above is shown Louis Disbrow's Jay-Eye-See, well known on the dirt track circuit. Originally it was a Fiat and Lewis Strang drove it in many record trials in 1910. The lower illustration shows Ray Harroun in the Marmon Wasp in which he won the 500-mile race at Indianapolis in 1911

double, that is, two to a cylinder, and were 2 inches in diameter. The inlet valves were single and $3\frac{3}{8}$ inches in diameter. The wheelbase is 108 inches and the chain-drive is arranged to give a variable gear ratio according to the size of the sprockets, but which usually is pretty close to 2 to 1. The car is owned by E. J.

Schroeder, the New Jersey millionaire.

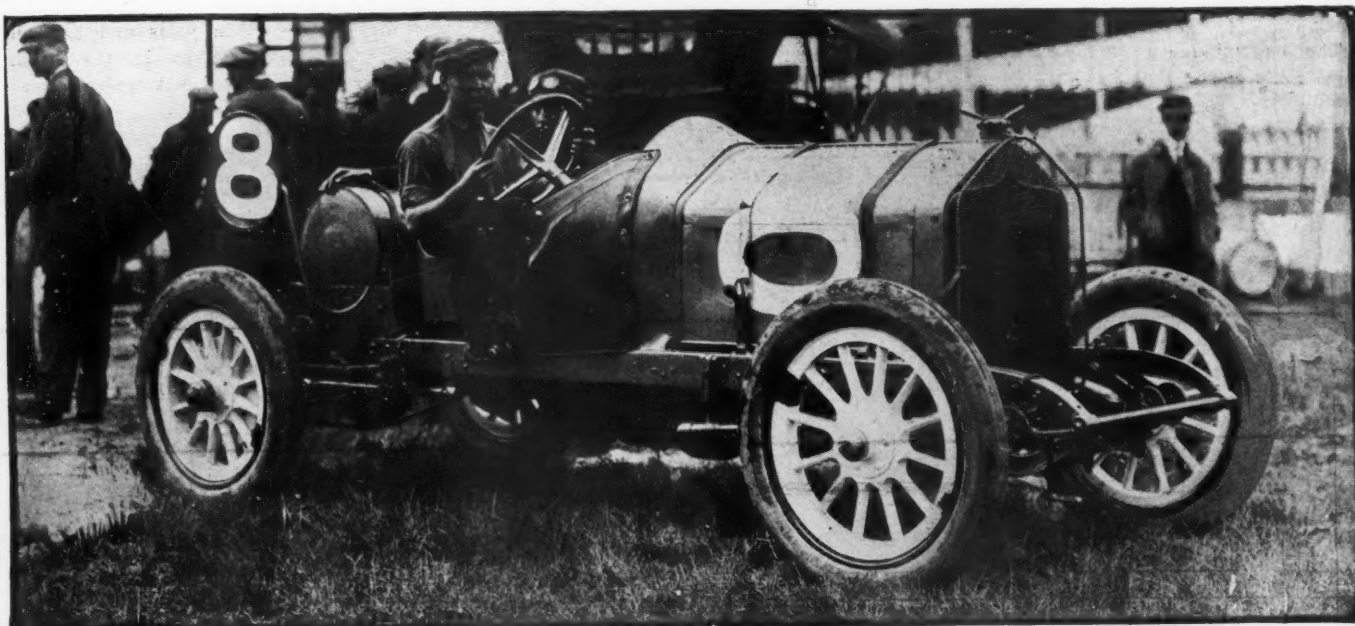
Another of the big cars which has an enviable record is the Fiat with which Teddy Tetzlaff won the world's road race record at Santa Monica, making a speed of 78.72 miles per hour. This car has a four-cylinder motor of 5 by $7\frac{1}{2}$ inches, giving it a piston displacement of 589

cubic inches. The drive is by double-chain and is usually geared between 2 and $2\frac{1}{4}$ to 1. Each cylinder has four valves, there being two sets of exhaust valves and two sets of inlet valves, making sixteen in all. Each valve is $2\frac{1}{4}$ inches in diameter and has a lift of 7-16 inch.

The Historic Blitzen Benz

A car which caught the popular fancy on account of its name, its record, its appearance and the exploits of its drivers, is the Blitzen Benz. It has a record of having twice beaten the 1-mile straight-away record. The first time it was driven by Oldfield, who broke Marriott's record, and then by Bob Burman, who broke the record made by Oldfield in the same car. The new records set up by Burman with the Blitzen Benz at Daytona, Fla., April 24, 1911, still stand. He beat Oldfield's 1-mile record of 27.33 seconds by making the mile 25.40 seconds. The 2 miles were covered in 51.28 seconds and the kilometer in 15.88. The record mile was made at the speed of 141.73 miles per hour, the fastest man had ever traveled until Duray's recent feat at Ostend.

The Blitzen Benz is a four-cylinder car with a bore of 7.2835 inches, and a stroke of 7.8741 inches, the cylinders being cast in pairs. The overhead valves are located on opposite sides, but there only is one camshaft. Two magnetos are used with a complete ignition system for each, there being one spark plug in each cylinder in each system, making eight plugs in all. There are four speeds to the gear-set with direct drive on high. The wheels are of wire, extra heavy and 32 by 4 inches in front and 34 by 5 inches in the rear. The wheelbase is 108 inches. The body is of the streamline design, having the pointed hood and pointed tail. The double chain drive is geared so that the ratio is 1 to 1 on high.



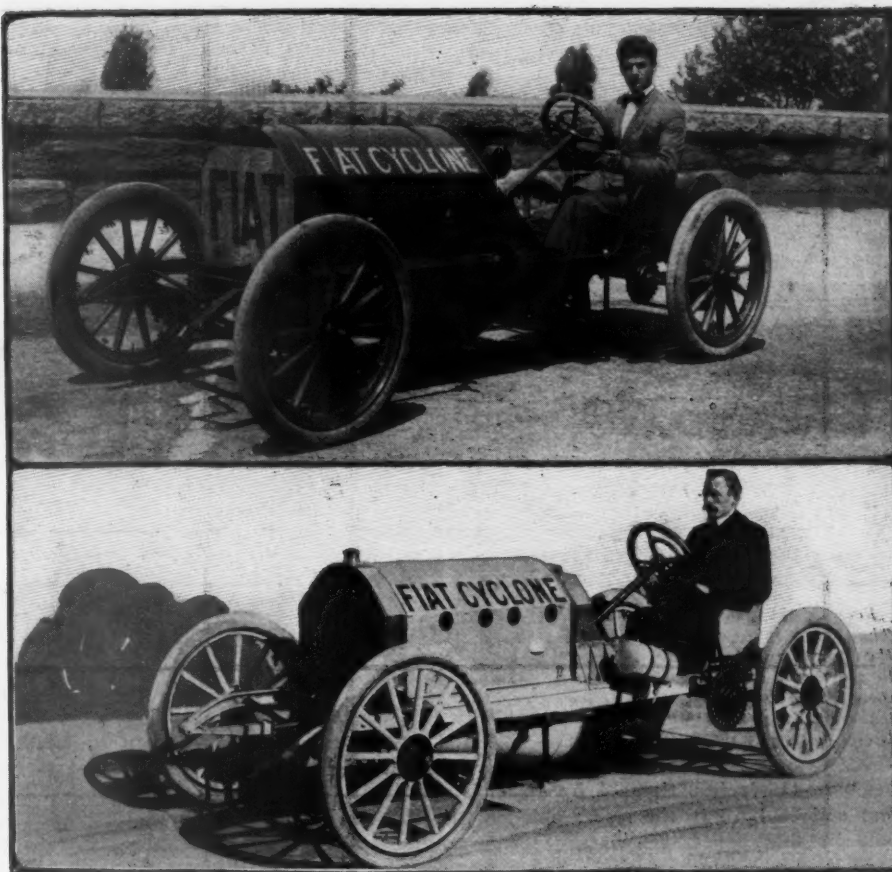
Joe Dawson became world-famous in 1912 when he piloted the National to victory in the 500-mile race at Indianapolis, establishing a record for the distance which withstood the attacks of the foreign invaders last year

A car which has made a name for itself within the past year is the Stutz, with which Cooper won the road racing championship last season. This car made its first appearance at the Indianapolis speedway race in 1913 with Donald Herr at the wheel. It only ran about seven laps of the 2½-mile track at that time, but immediately after the race was shipped west, making its appearance at Tacoma on July 4 and 5, with Cooper at the wheel. After winning these events, Cooper drove it at every meet on the coast with almost uniform success. Its most recent appearance was in the Vanderbilt and grand prix races at Santa Monica. It was in this car that Cooper won six road races last year. This car has a four-cylinder motor of 4.814 by 5.5 inches, cylinders are T-head cast in pairs and the gear ratio is 2.25 to 1. The car weighs 2,350 pounds and carries 25 gallons of gasoline.

Alco Twice Triumphant

Harry Grant and the Alco rose to the top of fame's crest. This combination of resourceful driver and efficient machine proving invincible in the fifth contest of the Vanderbilt cup, which was run over the Long Island course. Grant covered 278 miles at an average speed of 62.77 miles per hour. The 1910 contest, the red Vanderbilt of motoring history, was the sixth and last motor race on Long Island. Again the Alco with Grant at the wheel were unbeatable. After a lapse of 4 years the old car again was shown in the Vanderbilt at Santa Monica this spring, when, with Tony Jeanette driving, it also ran. This is a six-cylinder car, 4¾ by 5½ inches, giving it a piston displacement of 550. It was geared 2½ to 1.

The Indianapolis speedway has brought more than one car fame among the speed fans. The first one to gain national popu-



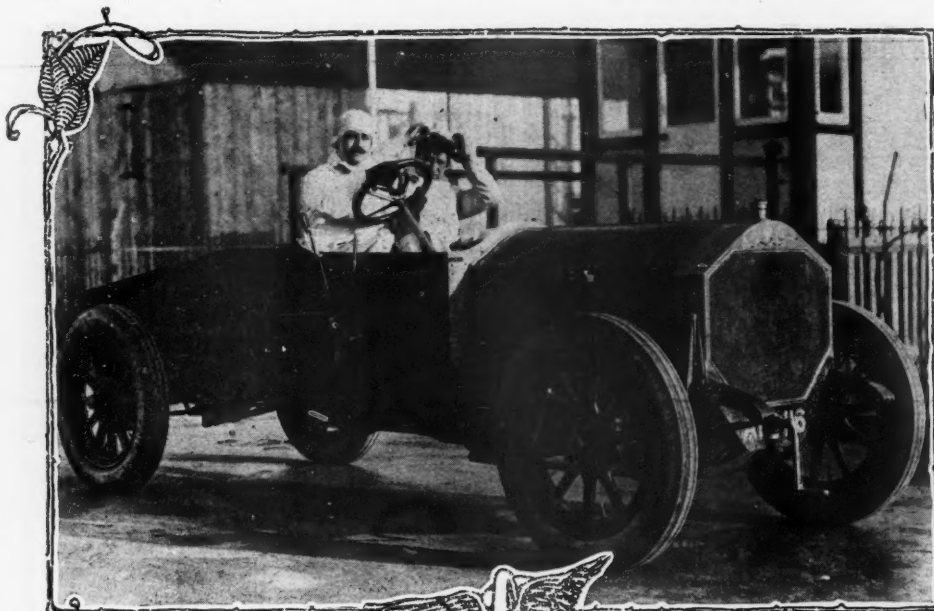
Two Fiat Cyclones have made good in American dirt track racing. The one shown above formerly was driven by de Palma. It still is being campaigned and only recently Oldfield smashed the 2-mile record in it. The other Cyclone was built for Cedrino, who was killed at Baltimore. In this little car the late David Bruce-Brown first broke into the limelight at Ormond when he was only a schoolboy

larity from the 500-mile event was the winner of the first 500-mile race, the Marmon Wasp, driven by Ray Harroun on Memorial day, 1911. This was a six-cylinder of 4½ by 5 inch cylinders, giving it a horsepower of 48. The valves were

on opposite sides of the T-head design and the ignition consisted of a magneto with a double distributor. A gearset like the regular Marmon construction was on the rear axle, providing three speeds forward. The gear ratio was 2.16 to 1, the

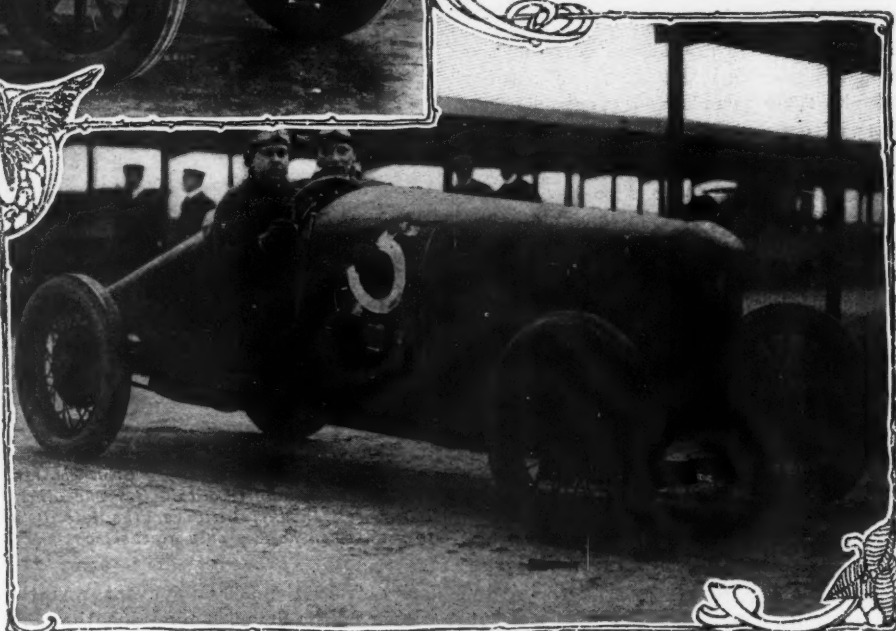


De Palma has figured prominently in several cars. Here he is in the Simplex Zip which he drove when he was campaigning on the dirt tracks. Disbrow now owns the Zip and it still is a speedy car



Few in this country ever heard of the Thames six, but for several years many of the Brooklands long-distance records stood to the credit of this car. It still is being raced and at the Easter meet it was a contender in the handicaps along with the twelve-cylinder Sunbeam and the Benz

wheelbase 116 inches, tires 34 by 4½ in front and 35 by 5 in the rear. This car made its first appearance at the spring meet at the Atlanta speedway in May, 1910, running second to de Palma in the big 90-horsepower Fiat in several events, and winning the 12-mile free-for-all from Lytle in the American and de Palma in a Fiat. It then appeared at the second Indianapolis meet May 30, 1910, winning the Remy brassard and Wheeler & Schebler trophy. The car was designed for high-speed work by the use of a long tail at the rear and sheet metal disks covering the wheels.



Another Brooklands veteran is the Benz, shown herewith. Hemery used to drive it and now Hornsted is the man behind the wheel. It now holds several of the world's short-distance records



Herb Lytle represented America in the Gordon Bennett in 1907 with a Pope-Toledo. He did not win that classic, but he put up a strong fight, getting some recognition as being the first American to finish in this ancient event

The second 500-mile race at Indianapolis produced another popular idol in Dawson's National, which won the 5-century event at a speed of 78.7 miles per hour. The National had a four-cylinder motor of 5 by 6¼ inches bore and stroke, giving it a displacement of 490.8 inches and rating of 40 horsepower. The cylinders were cast in pairs, the valves were on opposite sides and they were 2¾ inches in diameter. The wheelbase was 110 and it was geared 2 to 1.

Goux' Victorious Peugeot

The 1913 500-mile race took the speedway honors away from the American car and transplanted them to Goux and the

Peugeot. The Peugeot motor is a block casting of four cylinders of 4¾ by 7¾ inches, giving a displacement of 448.13 cubic inches. There are four valves in every cylinder, two for the intake and two for the exhaust. The diameter of lift are the same in all, 2½ by 25-64 inches. The valves are inclined at a 45-degree angle into the cylinder heads and are operated by cams on a single camshaft running over the top of the cylinders and driven by a vertical shaft from the crankshaft. The pistons are cut from solid blocks of steel, the valves are in duplicate throughout and the seats are on the underside of the cylinder casting, so that they are closed when raised.

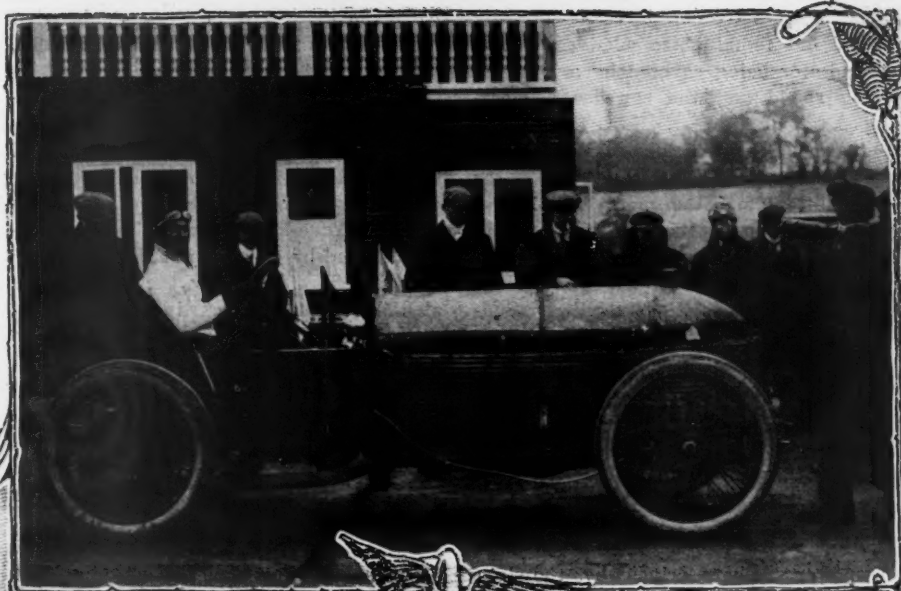
Details of 500-Mile Victor

Oil is forced to the engine bearings at a pressure of 30 pounds per square inch, considerably higher than that of most American racers, which is in the neighborhood of 2 pounds. The timing is such that the intake valves and exhaust valves are open at the same time. The car is designed to make about 115 miles per

hour, the motor revolving at 2,250 r.p.m. and developing 162 horsepower. Charles Faroux, consulting engineer of the Peugeot factory, says that during the race Goux never was able to develop more than 125 horsepower or exceed 1,700 revolutions per minute on account of the track. The clutch is of the multiple-disk type and the gearset has four forward speeds. The gear ratio was approximately 2 to 1.

The Twelve-Cylinder Sunbeam

Brooklands' track, the fastest continuous course in the world, also has been responsible for the popularity of a number of cars. Probably the one that gained the most fame there is the twelve-cylinder



The Napier six-cylinder still holds the world's 24-hour record of 1,581 miles 1,310 yards which was established in 1907 by S. F. Edge



The Thomas won the famous New York to Paris race in 1908. Undoubtedly this was the most strenuous endurance contest ever promoted and in it an American car distinguished itself by beating cars from France, Italy and Germany. The above illustration shows George Schuster, one of the drivers, at the wheel

Sunbeam. The cylinders are cast in sets of three and there are six cylinders in a row in V-type at an angle of 60 degrees. The cylinders are $3\frac{1}{8}$ by $5\frac{1}{8}$, giving the engine a piston displacement of 540 and a horsepower of 47 by the S. A. E. formula. There is only one camshaft, which lies between the bases of the cylinders, the valves thus being inside and rendered totally inaccessible by the exhaust pipe. Two carbureters are used, one at the rear end of each set of cylinders. From each carbureter, a pipe leads upward in an easy bend, turning midway in the cylinders to where it is attached to an ordinary inlet pipe turned upside down.

Details of English Champion

On the end of the camshaft a skew gear operates a cross shaft having a six-cylinder magneto at each end, so that the ignition is quite separate from each set of cylinders. In the matter of lubrication, this is different from standard, as there

are two pumps, one forcing oil to all the bearings, while the other sucks oil from the ribbed sump and returns it to the reserve tank. This keeps a constant level in the engine, which prevents an oversupply and also removes the need of pumping oil to the engine by hand. The clutch is an ordinary cone with the usual Sunbeam gearset through a double-jointed propeller shaft to the rear axle, the latter has no differential, tires are 34 by 4 and the high-speed ratio is 2 to 1, so that the engine revolutions give 100 miles per hour at about 2,000 r.p.m.



It is fitting to conclude this article with the above illustration, for it shows several of the men who have made racing history. The photograph was taken at Savannah in 1910. At the wheel is Nazzaro, the famous Italian driver. Next to him is Louis Wagner, the Frenchman, who won the grand prix that year. On the running board, from left to right, are Willie Haupt, Ralph de Palma and the late David Bruce-Brown

The lines have been very carefully worked out to minimize wind resistance, the radiator being covered by a long, tapering shield and the car has a cigar-shaped tail at the rear. Even the ends of the frame have been pointed at the front and rear to reduce wind resistance. The car holds all medium distance records of Brooklands, including that of 107 miles within 1 hour, beating Percy Lambert's record in the Talbot. It was driven by Chasagne, who will pilot the six-cylinder Sunbeam at Indianapolis this year.

Brooklands also was responsible for opening American eyes to another European car. To complete 100 miles in 1 hour long had been the coveted ambition of the motor car manufacturers since the recognition of protracted speed trials as the criterion of motor car efficiency. At Brooklands on February 15, 1913, the 25-horsepower Talbot, driven by the late Percy Lambert, covered 103.84 miles in a 60-minute run. This was the first car to travel 100 miles within the hour. In addition it set up new records for the 50-mile and 100-mile distances.

The chassis is said to be a stock 25-horsepower chassis, the motor being 4 by 5½ inches in size. In the record the engine speed was in the neighborhood of 2,800 revolutions per minute. Lambert, the driver, was killed October 31, 1913, in the same car while attempting to regain the 1-hour record, which had been taken away from him by the twelve-cylinder Sunbeam. The week before Lambert had set up a world's record of 50 miles, averaging 110.9 miles per hour, thus regaining the 50-mile record, which also had been taken away from him by the Sunbeam.

Hemery's Distinguished Benz

Brooklands also was the scene of the triumph of the 200-horsepower Benz, in which L. G. Hornsted wiped out former records for the standing start kilometer and the half mile. This is the identical car with which Victor Hemery made the records of 1909. Hornsted averaged 71.4 miles per hour for the kilometer and 70.47 miles per hour for the half mile, and also has established the world's best for the flying 10 miles at 112.57 miles per hour, the flying 5 miles at 116.08 miles per hour, and the flying 2 miles at 122.05 miles per hour. The car has a bore of 3¾ and a stroke of 7¾ inches.

It is only fitting to end up this glance into the annals of the past by bringing it up to date with the biggest and fastest cars in the world, the 300-horsepower Fiat which went at the amazing speed of 142.9 miles per hour, eclipsing Bob Burman's record of 141.73, made in the Blitzen Benz at Ormond Beach in 1911. Although the Fiat was officially timed at Ostend, December 16, 1913, at 142.9 miles per hour in an attempt at the flying kilometer record, the official mark was not secured for the European regulation called for the distance being covered in both directions.

Nevertheless, there is little doubt that the Fiat is the fastest car ever built, judging by its performance.

Duray's record-breaking Fiat is a chain-driven car, having a huge block four-cylinder motor of 7.48 by 10.4 inches bore and stroke. It follows the general Fiat racing motor design by having overhead camshaft and overhead valves, the whole being inclosed by an aluminum housing. The vertical shaft operating the camshaft is at the rear of the casting. Pump and magneto are driven by a cross shaft, also at the rear. The water intake pipe is carried alongside the motor from the bottom of the radiator to the pump at the rear, then back again with the two connections through the screwed-on copper jackets, forming two big panels on the side of the motor.

There are two separate exhaust outlets, these being short lengths of pipe just sufficient to carry the exhaust gases outside the bonnet. Two independent carbureters are fitted, each one feeding a pair of cylinders. For the record attempts the

car was fitted with a long windcutter ahead of the radiator, the opening for air to enter the radiator being only 2 inches across. A long tail also was fitted.

The car is chain-driven, and during the trials ran with Rudge-Whitworth wire wheels and Continental tires. Owing to the long stroke of the motor and the overhead valve gear, the car has an unusually bulky appearance, the height from the ground to the top of the bonnet being 5 feet 7 inches. This is almost the actual height of the top of the motor, for between this latter and the bonnet the clearance is the smallest possible. This big Fiat is owned by Prince Soukanoff.

This doubtless is the biggest successful motor put into a chassis. In 1911 Nazaro appeared on Brooklands track with a Fiat of 9.4 by 12.59 inches bore and stroke, but the car was so big and so hard to handle that it never did really fast work. Duray considers Brooklands unsafe for speeds of over 125 miles an hour, hence his attempts on the shore road at Ostend.

Little French Cars Show Fuel Economy

Remarkable Results in Long Road Test

PARIS, May 1—Out of twenty-two starters, eighteen light cars have finished the 2,000-mile endurance test round France in ten daily stages. The competition was of a distinctive nature. An average speed of 19 miles an hour had to be maintained for the entire distance, the fuel consumption was controlled, and a close account kept of the number of tires used.

It is the first time a fuel consumption test has been held over such a long distance. No really important mountain work had to be undertaken. Leaving Paris, the competitors passed through Tours, Limoges, Toulouse, Nimes, Monte Carlo, Avignon, Geneva, Besancon, Nancy, and back to Paris. This route avoided the Pyrenees and the Alps. During the 10 days they were on the road there practically was no rain, this of course helping in the matter of fuel consumption. On the first day a Humbrette dropped out owing to the car overturning in a ditch. Three others abandoned later, while the rest went through without any incident.

At the start each car was given one spare tire and one spare tube, these together with the tires on the wheels being stamped. With only one exception the cars covered the full distance on these tires. Rather curiously, the driver who had to make a call on the tire merchant had one of the lightest machines in the competition, his failure being due to defective tires rather than to the destructiveness of the machine. The largest car in the competition had a cylinder area of 153 cubic inches. Four machines were entered in the class limited to 67 cubic inches, and of these four one measured but 54 cubic inches. All the machines with the excep-

tion of an English Humber in the 122 cubic inch class had two seater bodies and weight cut down as low as possible, consistent with the rules.

The best performance was put up by a Hurtu four-cylinder two-seater car, which covered the full distance with a fuel consumption equalling 42.4 miles per gallon. This car was entered in the 122 cubic inch class. Following is list of cars having completed tour, together with their gasoline consumption for a distance of 1,952 miles:

Car and Driver	Gallons
Hurtu, Duval.....	46.03
Alva, Rasant.....	46.22
Majola, Senart.....	47.89
Automobilette, Chabot.....	51.40
Autorette, Guerry.....	53.46
Phoenix, Seguin.....	54.36
Gep, Pons.....	55.02
Ponette, Granvaud.....	57.55
Sigma, Dutel.....	59.70
Automobilette, Coignet.....	62.30
Scap, De Fromervault.....	62.30
Aquila-Italiana, Mathys.....	63.95
Fox, Paul.....	79.23
Scap, Genault.....	75.52
Arian, Lallier.....	71.25
Diatto, Matthys.....	64.04
Hispano-Suiza, Abit.....	94.64
Humber, Mora.....	96.55

PLANS MADE FOR LITTLE GLIDDEN

Des Moines, Ia., May 11.—The Iowa Little Glidden tour, under the auspices of the Iowa State Automobile Association, will be staged this year under the direction of Earl E. Butler, of Des Moines, chairman of the contest committee of the Polk County Auto Club. It will be a combination sociability and reliability run which will be timed to reach Sioux City for the big races there on July 4. The start will be from Des Moines on July 1 and the first day's run will be to Mason City and Clear Lake. After a night on the shores of the lake the tour will speed westward to

Spirit Lake for the second night. Storm Lake will be the next control for the third day and the tour will reach Sioux City on the evening of July 3. After spending the Fourth in Sioux City the tour will take a short Sunday run to Council Bluffs and Omaha. The last day of the tour will be from Council Bluffs back to Des Moines over popular routes.

MARMON VICTOR ON ATLANTA HILL

Atlanta, Ga., May 9—A Marmon car, owned by Dr. Frank Edmondson and driven by W. T. Edgar, took the feature event in today's hill-climb, winning the free-for-all in 47½ seconds. A Studebaker carried away two trophies, the Georgian-American cup and the Constitution cup, while the Pope-Hartford Old Betsy captured the fourth event and took permanent possession of the Atlantic Auto and Accessory Association cup, having won it in two previous contests. The summaries:

Free-for-all—Won by Dr. Frank Edmondson's Marmon; time, :45 1-5. Times of the other contestants: Pope-Hartford, :50 2-5; National, :51; Studebaker, :59 1-5; Studebaker, :59 3-5; Studebaker, 1:02 2-5; Studebaker, 1:10 4-5; Ford, 1:11; Metz, 1:14.

Georgian-American Cup—Won by Studebaker; time, 1:04 1-5; second, Studebaker, time, 1:12.

Constitution Cup—Won by Studebaker, time, :58; second, Studebaker, time, 1:00; third, Ford, time, 1:11 3-5; fourth, Metz, time, 1:13 1-5.

Journal Cup—Won by Stearns, time, 1:05; second, Overland, time, 1:12 4-5; third, Pope-Hartford, time, 1:16 2-5.

A. A. and A. A. Cup—Won by Pope-Hartford, time, :51 2-5; second, National, time, :52.

INSURANCE RATE WAR ENDS

New York, May 11—The rate war in motor car liability insurance, caused by a cut of 25 per cent by the Travelers' Insurance Co., has been practically settled through the mediation of the insurance department of the state. The bureau companies have agreed to restore rates on all risks effective after May 23. Non-bureau companies, it is expected, probably will join in with a like change in their rates.

The issuance of the family driving clause has been discontinued. The clause is an indorsement agreeing that the insuring company will defend damage suits for negligence brought against persons other than the insured who were driving the car at the time of the accident.

Both Road Races Awarded to 'Frisco

Vanderbilt and Grand Prix Sent West

NEW YORK, May 12—Despite the recommendations of Referee Wagner of the last Santa Monica meet, the Motor Cups Holding Co. has declined to split the Vanderbilt cup and grand prix road races and to the surprise of the motoring world it has assigned both the classics to San Francisco for 1915 when the exposition people only were asking for the Vanderbilt.

This was decided upon Monday after a committee of prominent San Francisco citizens had filed their brief with the powers that be. This committee consisted of W. L. Hughson, president of the San Francisco Automobile Dealers' Association; H. P. Scott, of the Union Iron Works; M. H. De Young, of the San Francisco Chronicle; R. A. Crothers, of the San Francisco Bulletin, and H. E. Cooley, chief of special events at the exposition. All of these are directors of the exposition and sought to get the road races as one of the feature events of the big show.

It has not been decided just when the races will be run, but in all probability they will be staged either in May or June, allowing for the 500-mile race at Indianapolis so as not to have a conflict. The Vanderbilt and grand prix will be run at least 2 weeks apart. The course already has been selected. It is about 5 miles in length, part in Golden Gate park and part outside.

FLOODS FORCE FORD SHUTDOWN

Detroit, Mich., May 13—Special telegram—Because of a steady downpour of rain for 36 hours, which is the record rain fall for May for the past 42 years here, the Ford Motor Co. was obliged yesterday afternoon to shut down, due to the flooded condition of its power plant. Inadequate sewers connecting with the city mains are said to be the cause of the covering of the powerhouse basement with about 2 feet of muddy water, short-circuiting much of the electrical machinery and damaging the power cables. This made it impossible to work the 5,000-horsepower motor, despite

the almost continuous efforts of powerful steam pumps ever since the water threatened to flood.

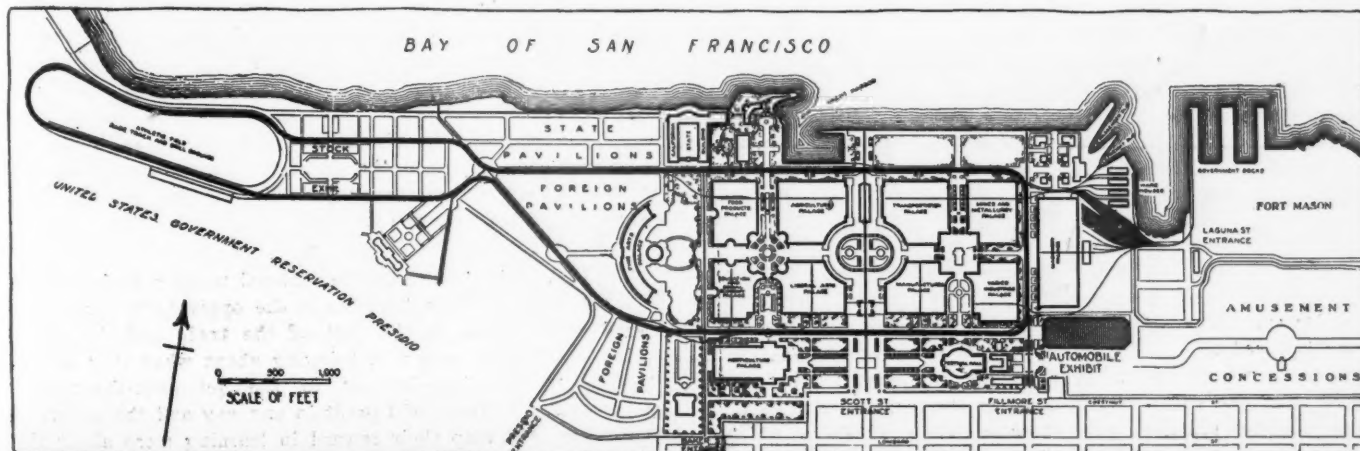
Accordingly Secretary James Couzens ordered a shutdown of all departments requiring moving machinery until Friday morning. This means a 3-day layoff and, figuring on the \$5 daily wage, is a loss to the 13,000 idle men of about \$165,000. Mr. Couzens stated today that the damage to the plant is very slight, although the interference with the concern's 1,000-cars-a-day schedule of production is serious. It is expected that everything will be in working order when the plant is opened up again Friday morning. The office force of about 1,000 is not idle.

DANIELS OUT OF OAKLAND

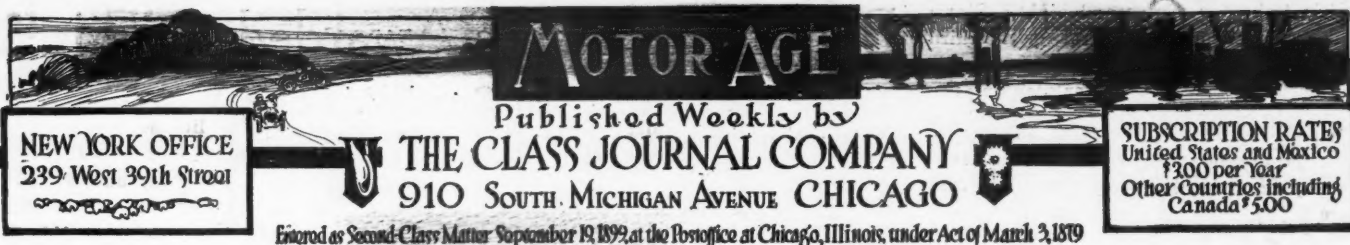
Detroit, Mich., May 12—George E. Daniels, for 3 years vice-president and general manager of the Oakland Motor Car Co., Pontiac, Mich., has tendered his resignation from the company and his work henceforth will be undertaken by President C. W. Nash, of the General Motors Co., of which the Oakland company is a subsidiary. Mr. Daniels has not announced his future plans.

HERRESHOFF REAL ESTATE SOLD

Detroit, Mich., May 12—The entire real estate of the Herreshoff Motor Co. has been sold to the Jacob-Nichol Realty Co., Detroit, for the sum of \$75,000. Personal property, including all office and factory furniture and fixtures, finished and unfinished merchandise and all other materials with the exception of accounts and bills receivable have been purchased by the Harris Bros. Co. for \$14,000. On recommendation of the Detroit Trust Co., receiver, both transactions have been confirmed by Referee in Bankruptcy Lee Joslyn. The Lycoming Foundry and Machine Co., Williamsport, Pa., the largest creditor of the Herreshoff company, made a bid of \$69,500 for the property at the first hearing, but this offer was rejected.



PROPOSED SAN FRANCISCO ROAD RACE COURSE



NEW YORK OFFICE
 239 West 39th Street

MOTOR AGE

Published Weekly by
THE CLASS JOURNAL COMPANY
 910 SOUTH MICHIGAN AVENUE CHICAGO

Entered as Second-Class Matter September 19, 1899, at the Postoffice at Chicago, Illinois, under Act of March 3, 1879

SUBSCRIPTION RATES
 United States and Mexico
 \$3.00 per Year
 Other Countries including
 Canada \$5.00

Racing as a Business

RACING in America has become a business and it promises to become a paying profession at that. With one speedway already established, three others in course of construction and with several of the larger cities considering speedway propositions, the future of the sport looks bright indeed. Even this year promoters are offering in the neighborhood of \$200,000 in cash for racing attractions, and the main difficulty is in getting enough cars and drivers to go around. The promoters are fighting for the best dates, and altogether it looks like a big year. Looking ahead, one finds that 1915 ought to be even greater, for by that time there will be more cars built and more drivers developed.

THE awarding of both the Vanderbilt and grand prix to San Francisco for 1915 is only one of the straws that show which way the wind will blow, and with motor events as one of the big attractions of the exposition, the racing world cannot help but prosper. The only criticism of the award is that the Motor Cups Holding Co. did not split the two classics, as has been suggested so often. Giving the two plums to one city hardly will be conducive to general racing prosperity, even if those two events are to be run 2 weeks apart. Far better, it is held, to have let San Francisco have one and send the other to some other big motoring center—Los Angeles, for instance. By splitting the races in this manner the makers who support the game would have a better run for their money by spreading their publicity in different sections. The racing men, too, would be better served.

AS time flies there will be fewer and fewer road races and more speedway events, and it is safe to predict that inside the next 2 years there will be a chain of the big tracks that will extend from coast to coast, taking in such big cities as New York, Chicago, Indianapolis, Philadelphia, Tacoma, Seattle and Pomona, which will encourage the racing men to make the sport a profession rather than a pastime. Private owners will feel it worth their while to invest in racing cars, and there will be continued activity in the sporting side of motoring.

POSSIBILITIES along this line are well illustrated in the case of Indianapolis. Among the forty-five cars that are entered there are several American creations which have been specially built for this race for the reason there are few American manufacturers interested enough in racing to build cars. So the drivers have been forced to make the cars themselves. Some of them have turned out promising looking jobs, and the results of their work should be watched with interest by the industry as showing a possible development along a new line.

IT is reasonable to expect that some of these specially built cars which are to make their premier appearance at the Hoosier speedway will show speeds and stamina that surpass any displayed by creations of this class in earlier events. In fact, it is not unreasonable to suppose that some of the new speed machines, which represent rather the ideas of individuals than factory practice, will outshine many of these which adhere closely to a regular product.

IN former years the dark horses, about which little was known before the start of the events, were not regarded very seriously. The reason for this was that such cars ordinarily were old campaigners, which had fallen into the hands of some private owner and were by him patched up and tuned up for the race, and really had little chance for the money. This year, however, there will be fewer of the "repair shop specials." But the dark horses, the unknowns, are as numerous as ever.

THIS is because real engineers are engaged in their planning and construction—men who have learned how to build racing cars from years of experience on the track. Racing car engineering will be evidenced in the productions of such men as Harroun, Burman, and perhaps Hughes. When it is possible to produce a racing car motor which weighs but 650 pounds and yet develops 140 horsepower at 2,400 r.p.m., as has been done in one of the new cars, according to report, real racing car engineering has been evidenced.

ON the assumption that some of these are the products of the highest talent in the design of motor cars, it would seem that these new creations might be a forecast of what the ordinary touring car of the future will be. The possibilities for tomorrow are even more interesting than the realities of the present. Perhaps the car of the future will not have a flywheel, but like some of the cars at Indianapolis will have a counterbalanced crankshaft in its place; perhaps the connecting rods will be hollow for lubricating; perhaps new alloys will be used for pistons and connecting rods. Lighter but stronger motors, larger valves, lighter reciprocating parts, better bearings and lubrication systems may be expected. And in one word, this means greater reliability and lower cost of operation—just what the ordinary motorist wants of his car.

Encouraging Touring

EFFORTS on the part of the American motor car manufacturers, through the National Automobile Chamber of Commerce, to encourage touring is a step in the right direction, for by all the signs of the times the motorists are eager to get out into the country and get the real worth out of their cars. This is shown by the success of these so-called sociability runs, a mild form of contest that cannot help but interest the enthusiast. It has been found well-nigh impossible to get the average motorist to participate in a club run, but ask him to compete for a prize and he is eager to take advantage of the opportunity. There isn't must to the sociability—merely a striving to see how close one can come to a secret time schedule, but there is the necessary incentive in it to get your city man out into the country. An example was had of this in Chicago last week when 200 motorists in forty-eight cars spent the day in the country.

ATENTION is called to the national touring week, set for the week of July 4. Here is the opportunity for a get-together movement on the part of the trade and the clubs, which surely must result in bringing about what they are so desirous of securing—interest in the get-out-in-the-country movement. The trade will profit in one way and the motorists themselves will reap their reward in learning more about the country and the joys of motoring.

Saxon Completes 30-Day Road Test on Detroit Streets

Little Car Runs 135 Miles Per Day for a Month

DETROIT, Mich., May 9.—A parade and the presentation of the Pontchartrain cup by Mayor Marx were the ceremonies here today, marking the completion of the 135-mile-a-day Saxon car of its run of 30 consecutive days. Headed by a brass band in a big motor truck, the procession swept through the downtown streets of Detroit while thousands lined the curbs to watch it. In the line of march also was a string of more than twenty-five Saxon cars, manned by uniformed crews, each car bearing a banner that told of some of the records by the Saxon Motor Co. and of its cars all over the country.

Near the Pontchartrain hotel the parade halted while a big crowd gathered about to witness the chief official of Detroit present a silver cup to M. A. Croker, who piloted the 135-mile-a-day car.

The 4,050 mile run ended yesterday afternoon in a driving rainstorm which, however, did not prevent the Saxon from checking in on schedule at each trip. When the final results were figured it was found that the machine averaged 30 miles to the gallon of gasoline and 200 miles to the quart of oil. No repairs or replacements of parts were required during the long grind, and the journey was made on the original set of tires, which still display no signs of wear.

In making its run this car covered a course of close to 12 miles 330 times. The daily trips to and from the starting points brought the total for each day's run up to 135 miles. Eleven laps were made about the circuit every day, each one on a schedule of 45 minutes. The cost in fuel consumption has been figured at $\frac{1}{2}$ cent a mile, or $\frac{1}{4}$ cent per mile per passenger.

The run was observed and checked from start to finish. Before and after each trip Croker checked in the time in the presence of R. Elliott and T. Lavalier, who entered their names in the capacity of checkers. Both the observers are associated with the Pontchartrain hotel.

Having brought the 30-day trial to a successful conclusion, the Saxon company is arranging for a non-motor stop economy trial to be held on May 16. Saxon dealers throughout the country are expected to enter. Each dealer will enter a car with a driver and an observer. The conditions call for a run of 200 miles without stopping the motor, and the car that finishes on the smallest amount of gasoline will be awarded a prize. The course is left to the discretion of the entrant.

WOMAN WINS C. A. C. SOCIABILITY

Chicago, May 11—First prize in the secret time contest of the Chicago Automobile Club's sociability run to Cedar Lake, Ind., Saturday, was won by a woman driver, Mrs. A. L. Barnes. Her run-

ning time to the Hoosier resort and return was 5 hours and 5 minutes, which was within 1 minute of the secret time schedule fixed by the judges. Forty-eight cars started.

QUAKERS REGULATING TAXICABS

Philadelphia, Pa., May 9—A measure has been introduced into select council to regulate the control of taxicabs and all hired motor cars, which, if enacted into law, will not only increase the city revenue but at the same time cut the present cost of taxi fare, which would be appreciated.

The regulation, which has been referred to the law committee for action, would place the taxicab service under the director of public safety and compel chauff-

eurs to take out a license every year, to cost \$50. The chauffeur would be required to record his name, address and the number of the car he drives, the number to be painted on the front of the lamps. In addition he should wear a button with the number of the vehicle operated by him thereon. The prices to be charged for taxi hire have been set down in the bill as follows:

For from one to four passengers, 50 cents for the first $\frac{1}{2}$ mile and 10 cents for each additional $\frac{1}{4}$ mile. Each additional passenger, 20 cents.

Five-passenger touring car, \$3.50 for the first hour, \$3 for each additional hour. Seven-passenger touring car, \$4.50 first hour and \$4 for each additional hour. Rates, name and residence of driver, his number and number of car to be printed in four languages—English, French, German and Spanish—on a card to be hung in a conspicuous place inside the car.

Meters of taxis to be inspected by city inspectors and violation of any regulation punishable by revocation of license and a fine of \$5 for each offense.

CHANDLER WEIGHT MISSTATED

Chicago, March 11.—In the item concerning the Chandler-Rayfield economy test in Motor Age of May 7 it was stated that the Chandler six used in the test weighed 3,530 pounds without passengers. This was an error. It should have read 3,030 pounds. The typographical error in this instance is particularly regrettable as the Chandler Motor Car Co. prides itself upon low weight. It is worthy of note that the official weight as determined by the Chicago Automobile Club's technical committee is only 145 pounds greater than the advertised shipping weight of the car and the difference can be accounted for by the supplies of gasoline and oil, spare tires, robes and so on, that were carried in this test.



Mayor Marx, of Detroit, congratulating M. A. Croker, driver of Saxon, after the latter has been presented with the Pontchartrain cup at the end of the 30-day run



Saxon cars lining up for parade to celebrate the completion of 30-day run in Detroit by the 135-mile-a-day Saxon

First of the Foreigners Check in at the Speedway

Boillot and Goux Arrive—Gossip of the Big Race

INDIANAPOLIS, Ind., May 13—With the entry list of forty-five cars for the fourth annual sweepstakes an established fact, the speedway management is pushing arrangements for the staging of the classic on May 30. Finishing touches are being put on the stands, the ticket sale is getting larger each day, while actual practice already has started. Inside another week the majority of the drivers will be here. The seat sale already is 30 per cent larger than it was a year ago this time and there is every indication of a most successful race.

Goux and Boillot, of the Peugeot team, accompanied by their mechanics, reached here Monday and were given a dinner that same night by Manager Sedwick. Several of the American drivers attended and the affair was quite international in character. The foreigners were astounded at the size of the entry list, but feel confident that the big end of the purse will go to Europeans. They do not fear the eliminating trials, claiming that their cars are plenty fast enough to survive this ordeal.

The other foreigners are scheduled to reach the speedway not later than May 15. They sailed from Havre Saturday, twelve in all, the party including Rene Thomas and Albert Guyot, of the Delage team; Jean Chassagne, of the Sunbeam; Arthur Duray, with the little Peugeot; Josef Christians, of the Excelsior, and Ernst Friedrich, of the Bugatti, all in charge of W. F. Bradley, European representative of the speedway.

Harroun May Drive

While it is by no means certain, still it would not be surprising if Ray Harroun himself drove in this year's race. Indeed, gossips have associated his name with the vacancy on the Maxwell team and it is said that because of the scarcity of driving material Harroun may be forced into the combat, despite his oft repeated declaration that he never would race again. It seems that the deal with Hemery hardly will materialize and as nearly all the other good men have been grabbed up a radical step will have to be taken. If Harroun does go in the Maxwell will make a formidable opponent with such pilots at Tetzlaff, Harroun and Carlson.

Another celebrity has slid in at the eleventh hour—Louis Disbrow, the bread winner for Alex Sloan, who has been signed by Bob Burman to take the wheel of the second Burman special. Billy Knipper, originally scheduled for the job, has been transferred to the Keeton, which is Burman's third entry. The Isotta job has been assigned to Ray Gilhooley instead of J. B. Marquis, as the railbirds had figured it out.



BOB BURMAN'S NEW CAR WITH THE DRIVER-BUILDER HIMSELF AT THE WHEEL

Interesting Facts About the Rayfield, Beaver Bullet

DETAILS are now at hand of Hughes' Rayfield, the racing car that the English driver is building at the Rayfield Motor Co.'s works, to make its first appearance at Indianapolis. The car is the design of William Rayfield and Hughes. The motor was built by the Rayfield Motor Co., and is a six-cylinder, of 4,135 bore and 5.5 stroke, making a displacement of 443.6 cubic inches. Valves are $2\frac{1}{8}$ inches in diameter and have a lift of $\frac{1}{2}$ inch. These valves are placed so close to the bore of the cylinders that it has practically the same effect as the overhead system, as there are practically no pockets and the explosion is concentrated above the pistons.

Hughes has aimed to keep the whole car very light and has been so successful that it weighs only 1,950 pounds. The streamline effect is carried out to the limit, and in order to do away with the usual banking of the air against the floor or dashboard when it comes through the radiator in front, the radiator has been placed on the side, allowing the same amount of

cooling surface on each side of the car as there ordinarily is in a front radiator. The two radiators are as high as the body and consequently project outside of the frame very little.

This permits a very narrow body and at the same time allows the hood of the car to come to a point so that the air goes through the coolers and passes on without banking against any part of the car. Hughes states that the whole car is handmade and great care has been taken in the selection of material. He predicts that he will be able to make a speed of 110 miles an hour on the track.

Another of the dark horses is the Beaver Bullet, a special racing car designed and built by Charles L. Rogers and Charles F. Keene for the Beaver Automobile Co., Beaver Falls, Pa. It too will make its maiden effort at Indianapolis. The car is very original in design and was made especially for that and similar speedways. The motor has four cylinders of the T-head type of 5.1 by 5.5 inches, giving it a dis-

S. F. Brock, who recently entered a Ray car, is not a Hoosier at all, as was originally announced, but an Oregonian, hailing from Portland. He is a motor boat expert, owning the Wisconsin and Oregon Kids, said to be the fastest gasoline craft afloat, with speeds variously stated at 63 and 64 miles an hour to their credit. He came to Indianapolis only to be on the ground while his car was being made ready, a circumstance that led to the confusion of his nativity.

Never again will the spectators at the 500-mile race hold their breath, while the starter dodges in among the bullet speeding cars at the risk of his life to flag the winner. A bridge over the track, from the judges' stand, is being constructed to

obviate this hazard. Carl Fisher has had such an improvement in mind ever since Joe Dawson flecked the coat of Fred Wagner while the latter was giving him the office in 1912.

Bridge for the Starter

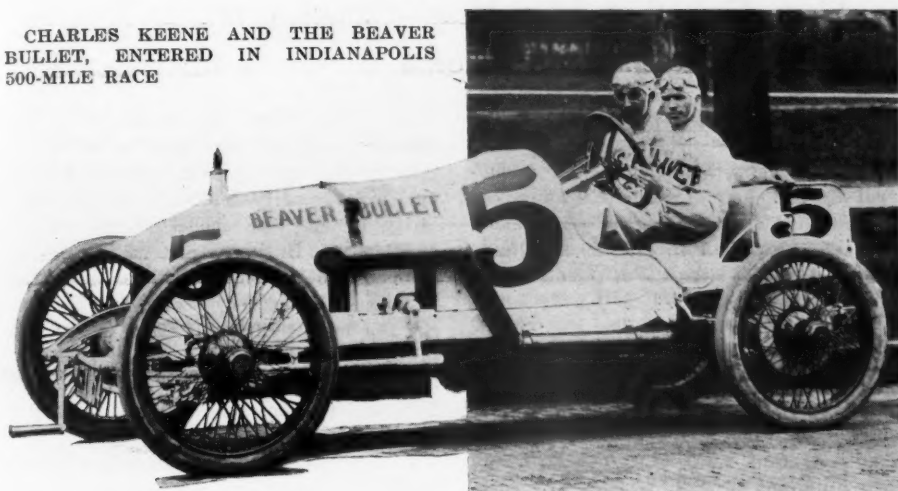
Another innovation is the erection of flag poles all over the grounds to display the emblem of the nation that is ahead in the contest. As the cars change places their standards will be hauled into their relative positions. Thus the entire concourse will know the exact moment at which either America steps into the lead or slips back in the running.

More prizes have been hung up for the Indianapolis race, the latest offering coming from the Waltham Watch Co. It will

Gasoline Famine Threatened in the Southwest

Scarcity of Refineries Alarms the Independents

CHARLES KEENE AND THE BEAVER BULLET, ENTERED IN INDIANAPOLIS 500-MILE RACE



and Burman Special Entered in the Indianapolis Race

placement of 449.4 cubic inches, within .6 inch of the limit. The valves are 3 inches in diameter with a 4-inch exhaust line.

The whole construction has been very carefully carried out. The car has a 101-inch wheelbase; the equipment includes Dunlop wire wheels and Bosch two-point ignition. In the tryouts around Beaver Falls the car is reported to have been very fast. It already has arrived at Indianapolis. Keene will be at the wheel with Rogers as relief. The former is a pioneer driver, having started as a road tester in the Pope Motor Car Co.'s plant at Toledo in 1903. He also was on the Toledo racing team in the early days. Rogers has been connected with the motor car and the aeronatic industries for a number of years as experimental man and road mechanic and has been connected with several prominent racing teams.

From Bob Burman come further details as to the construction of his fleet of racers. He reports that he has one of the cars on the road for the past 4 weeks and the other

one has been doing road work for a week or 2. His two specials are exactly alike. The motor is a four-cylinder engine, having sixteen valves, two inlets and two exhausts in the head of each cylinder.

This engine was calculated by Burman and Mr. Milbrath of the Wisconsin Motor Co. the evening after last year's Indianapolis race. So well were their calculations and the construction carried out that both engines developed 134 horsepower at 2,250 r.p.m. The equipment as it is determined at present includes Thermoid tires, Rayfield carbureter, Remy magneto, Houk wire wheels and Mayo radiator. The wheelbase is 107 inches and the tread is standard. Burman and Disbrow will drive the Burmans.

The Keeton which Burman entered is the same car he drove last year. This is a four-cylinder car with 5.1 by 5.5 cylinders; its displacement is 449.4, the same as the Beaver Bullet. The only change in the car is in the carbureter, which this year will be a Rayfield, Billy Knipper will drive.

be known as the "Waltham efficiency prize," and it is to be given, not necessarily to the winner of the race, but to the driver of the car who finishes among the first three and at the same time displays the greatest efficiency. Efficiency will be established by the length of time spent at the pits, that is, for making repairs, adjustments, or tire changes. The offer is made by the Waltham Watch Co. and accepted by the Indianapolis motor speedway on behalf of the entrants. The winner will be decided by David Beecroft, official representative of the A. A. A.

In offering the prize the Waltham company states that it is actuated by the desire to promote efficiency as well as speed in motor car racing.

The Waltham efficiency prize is valued at \$500. It consists of the "Waltham Premier Maximus" solid gold watch in a silver box and accompanied by the so-called Kew class A certificate of accuracy. This certificate was issued by the Kew observatory in England after the watch was put through severe tests as to its accuracy in timekeeping.

Another Carbureter Prize

The Longuemare Carbureter Co., of New York, whose wares are used on the Boillot and Goux Peugeot, the Chassagne Sunbeam and the Isotta, offer \$1,600, divided \$1,000 for first, \$400 for second and \$200 for third, provided Longuemare carbureters are used. This is the fourth carbureter concern to make such an offer.

KANSAS City, Mo., May 9.—A gasoline famine during the last months of the summer was forecasted at a specially called meeting of the independent oil refiners of Kansas and Oklahoma in this city last week. Thirty per cent of the gasoline stored for use during the hot months has been used during the last few months and predictions were made that within 60 days the surplus would be used up.

In the mid-continent field—the largest in the United States—a surplus of 8,400,000 gallons was stored during the winter by the independent refiners. The Standard Oil Co. made no provisions beyond its annual storage.

"The use of gasoline has increased 25 per cent this spring," D. W. Moffitt, of Coffeyville, Kas., president of the Western Petroleum Refiners' Association, said. "And now on the eve of the greatest crop year the middle west has seen for many years and one of the most prosperous for the entire nation, motor car dealers everywhere report increased sales of cars. The shortage is more than a threat—it is imminent within 60 or 90 days."

One filling station in Kansas City is selling 8,000 gallons a day and several are disposing of from 15,000 to 20,000 a week. In St. Louis reports to the refiners were of even larger sales. But despite the apparent diminishment of supply, the price is lower than it has been for many years. Gasoline of the best grade is sold here at 12½ cents a gallon and wholesale lots as low as 7½ cents have been reported.

The famine will be due, not to lack of crude oil, but to lack of refineries. The oil fields of the two adjacent states have gone through a second boom. Prices for crude oil at the wells jumped during the last winter to the untouched prices of \$1.05 a barrel and production increased by leaps and bounds. In the Cushing fields new wells are being brought in at a rate of 300 a month, despite the recent declines in price to 75 cents a barrel. A new pipe line from the Cushing fields to the Standard Oil Co. refinery at Wood River, Ill., has been unable to take care of the increased flow.

WRIGHT A SOCIABILITY WINNER

Philadelphia, Pa., May 10—George D. Wright, driving a Chevrolet car, finished within 2 minutes 35 seconds of the secret time—(6:24.45)—and was awarded the first prize in the seventh annual sociability run of the Quaker City Motor Club, held yesterday from the Hotel Walton, here, to the Hotel Strand, Atlantic City, N. J. Twenty-one cars made the trip.

The official time was announced by adding the times of the cars together and dividing by the number of contestants, which made it 6:24:45.

Factory Conditions in the Hub of the Motor Industry

All Plants in City of Detroit Operated at Capacity and Half of Them Running Overtime—
Majority Building More Cars than Last Year—Situation in
Moline, St. Louis, Racine and Kenosha

DETROIT, Mich., May 9—After a visit embracing more than a score of the leading passenger car, truck and accessory factories in Detroit, Motor Age has found the industry in the city of the Straits, which is the mecca of motoring in America, to be in a most favorable condition, so far as manufacture is concerned. All of the factories are operating at capacity and over half of them are working the machine shops at night and some of them on Sunday forenoons in addition. A few which started manufacture early are practically through with the production of 1914 models, and are getting cleared away for 1915 jobs. In some factories the first allotment of 1915 models are under construction, although announcements of them will not be made probably until July 1.

In spite of the continued backward weather in February, and the financial depression which has been so general over the country, and the failure of crops in some of the western grain states, and the effects the tariff has had on the sugar industry in the gulf states, the general condition must be considered good and in the majority of the factories the business for the first 4 months of the present year is much in excess of a year ago. Nearly all of the factories are building more cars than last year, there being a few exceptions where the output is the same, and still fewer where this year's output is lower than that of a year ago.

An interesting aspect of the Detroit industry is the progress made by two or three of the light car and cyclecar companies, such as Saxon, Car-Nation and Scripps-Booth. These companies are all manufacturing in large outputs and making regular deliveries. The Ford company is working at approximately 1,100 cars per day. Packard business shows a very great increase over a year ago. Hudson has had a remarkable trade on its small six. Chalmers has recently enjoyed one of the biggest months in its history, and so the story of increased output continues.

Improving Manufacturing Methods

One of the most satisfactory developments in many of the Detroit factories during the past year is the increased efficiency brought about by internal rearrangements of manufacturing processes. In some factories more cars are being produced with fewer men than a year ago. Ford has had in operation for some months his new progressive assembly system whereby eighty men are able to assemble a chassis every 53 seconds. The

By David Beecroft

Editor's Note—This is the first installment of Mr. Beecroft's article telling of the condition of the motor car manufacturing industry in Detroit. In the next issue of Motor Age the situation at the other factories will be described.

Timken-Detroit Axle Co. is getting greater efficiency out of its workmen by an application of motion study to manufacture, and better factory organization. The same is true of many other concerns.

New Buildings Erected

Although building operations are not so active as they were a year ago there have, nevertheless, been many new factory buildings erected within the last year. Paige is located in its entire new factory. Ford is erecting a mammoth shipping building. Abbott has just completed a new building. The Standard truck is in its new factory, and in several other places additions are being contemplated. Saxon has had to build temporary sheds to take care of its rapid production, and at the Car-Nation plant two big tents are used for emergency factory purposes.

Although the Detroit story of trade conditions is a most favorable one, so far as actual factory production is concerned the presidents and general managers of the companies are equally optimistic on the dealers' situation. The dealers throughout the country are in better condition than a year ago, so far as the majority of the factories are concerned, although there are a few companies that still bewail the poor condition of the dealer. Many factories have worked actively to improve the dealer's lot by assisting him in handling the trading question, as well as conducting his business. Trading is now looked upon as a legitimate part of car-selling, and the manufacturers have aimed at making their dealers more rational in handling this work. Trading cannot be eliminated but must be controlled, and in this respect many of the companies have made commendable progress during the past year.

A few of the manufacturers have gone still further with their dealers and have regulated the shipment of cars to them, refusing to allow the dealer to stock up in advance unless quick selling conditions would warrant such. On the other hand, there are several companies that have consigned cars to their dealers so as to have them ready for quick warm weather delivery.

Business for the past 4 months at the Packard company has been much in excess of the corresponding period a year ago, a fact partly explained by the popularity of the 2-38 model known as the small six. During April the company shipped 416 passenger vehicles and May is expected to exceed this figure. At present the output of small sixes is entirely taken up and there are unfilled specifications for fewer than 100 of the large cars. This will complete the company's output for the coming season.

A characteristic of Packard business during the past year, according to Sidney D. Waldon, vice-president, has been the more uniform rate of production than ever before by this company. From the time production started until the present there has been a general uniformity which has naturally avoided the necessity of putting on an extremely large force of workmen at any season. The company has been largely responsible for this policy, and has actively engineered its selling forces in order to bring this about. Special efforts were made to stimulate early buying of the closed cars, many specifications for these being placed in the early spring or fall delivery. As a result of this precaution the early fall was a period of uniform production rather than one of great congestion.

Packard Dealers Active

The company also has extended its dealers' organization, pushing the confines of selling activity into cities where relatively few, if any sales, were made previously. Although one-half of the Packard output is sold in such centers as Boston, New York, Philadelphia and Chicago, yet this pioneering work has proven particularly valuable and now such centers as Salt Lake City, Kansas City, Cleveland, Syracuse, Memphis, etc., have particularly active selling organizations.

The Packard company always has been conspicuous because of its specially good merchandising methods, and this year it has carried on a selling competition which started January 9 and is continued up to the present. The factory issues weekly reports on the percentage of efficiency of its different dealers as compared with previous years. These are tabulated on a large poster distributed weekly throughout the selling organization, and each dealer sees at a glance his percentage of efficiency as compared with a year ago, and can further see how his efficiency stands as compared with other dealers. Not only does this prove an incentive to the individual dealer, but furnishes the company with a

very accurate rating of the strength of its respective selling units.

Not only has the Packard company been alert in the merchandising field, but it has been equally so in the production end, and in addition to effecting a uniformity of production over the fall, winter and spring months, it has increased the efficiency of its factory so that now with a force of 5,000 men it is producing more cars than it did with a force of 7,000 men 18 months ago. This has been made possible by improvements in factory organization and instituting various forms of pacesetting methods whereby production is quickened. This increase in productivity has largely eliminated night work in all of the factory departments. Progressive methods of assembly have been instituted and the premium idea which was started a year ago has worked out very successfully.

Rebuilding Used Cars

The Packard company continues its policy of practically rebuilding all of the used cars which come into its possession. Approximately one-half of the sales each year are made to previous Packard owners and generally used cars are taken in exchange. Instead of turning these used cars out in practically the same form that they were received, they are entirely overhauled, repainted and put out carrying practically all of the earmarks of new machines.

C. R. Norton, sales manager of the truck department of the Packard company, reports that shipments of Packard trucks for April were 60 per cent over a year ago and in March the truck business of his company was in excess of \$750,000. He looks forward to business through May exceeding that of a year ago. When the total of these 3 months is averaged with the duller business of January and February it will put the aggregate of business for the first 5 months of this year well ahead of the corresponding months of a year ago.

At present there is a slight tightness in the money market and the truck market was under par until the middle of March. Mr. Norton believes that the opportunity for marketing trucks has been steady, that it is steady today and that it will continue to be steady in the future, but that good concentration of effort on the part of the selling forces is needed, particularly in times when the money market is under criticism. In other words, it takes good salesmanship to sell motor trucks, a different brand of salesmanship from that required in disposing of passenger vehicles, but where the salesman is armed with the proper arguments and is able to analyze the conditions of the buyer, that there is today a good, steady market for trucks.

Repeat orders constitute a large factor in truck sales, but the Packard company has carried out since the first of the year an aggressive co-operative policy with its

selling organizations. During this time the south, particularly the southeast, has given evidences of becoming a stronger factor in the truck field. According to Mr. Norton, what is needed generally in the truck merchandising is organization to back up the selling representations made by the different representatives. At present the Packard company is operating at capacity of six trucks per day.

J. M. Gilbert, president of the Lozier Motor Co., says that his company is leading its business mark of a year ago by over 100 per cent and that the first 4 months of this year nearly equal in business the 12 months of 1913 season. The new four-cylinder model launched last December has been a large factor in this increase in business. The factory is now averaging 500 cars per month. In addition to its present plant on Mack avenue, just outside of the city boundary, the company operates its old Plattsburg plant in New York state, where 600 men are employed. This factory produces nearly all of the iron casting, makes the steering gears and other parts, such as pistons, connecting rods, etc. It has been operating on day and night shifts practically since the first of the year. In the Detroit plant, employing 500 men, a capacity schedule has been in force for months.

Since assuming active control of the entire Lozier business Mr. Gilbert has directed his energies along two lines. First, the production of a small four-cylinder car, which he considers ahead of the six as a utility vehicle, which the motor car must be considered today; and, second, the production of such, as well as the conducting of the entire factory on an efficient basis. Mr. Gilbert is a merchandiser and naturally is proud of the fact that he cut the cost of conducting his business to 8.5 per cent for the month of March and expects to have reduced this figure for April, where the amount of business done was 25 per cent greater than that in March.

Practicing Economy

An example of how keen Mr. Gilbert is on efficient factory control is brought out in a recent incident of how a low-priced car is used for light freight and express work to and from the city, as it is cheaper to operate than a Lozier would be in the same work. Still another example is that when some office departments expected to have a Lozier at their disposal to go to and from the city, he pointed to the trolley line, which is intended for that purpose, and asked some of the men at the heads of departments that if they worked for a large department store, would they expect that store to buy a motor car for them in which to drive around the city.

The Cadillac Motor Car Co. has been one of the several to carry on a consistent campaign to stiffen the backs of the dealers, and for this purpose employs six district managers, whose sole duty it is to constantly move in and about the dealers and sub-dealers in their respective terri-

tories, not only carrying to these dealers the messages from factories on the best methods of doing business, but also working side by side with these dealers, thereby making certain that they understand the factory's wishes and also that systems of doing business in an up-to-date manner are actually installed. This system has proven very successful.

Sales Manager Howard of the Cadillac was one of the first to recognize the old adage that you cannot make money by buying an article for more than you can sell it for, and hence the necessity of impressing on dealers the basic consideration of making a rational allowance for a used car when taken in trade.

In handling its used-car business Cadillac dealers generally have followed the policy of rebuilding all used cars and putting them on the market as good appearing vehicles and giving with them some form of personal guarantee. This is good business policy, because it is a much better advertisement of a car for the dealers and for the maker to have a well painted, well performing used car than to have one poorly painted and not giving the satisfaction that the buyer expected.

Cadillac's Dealers' Policy

The Cadillac company has made it one of its policies of business to stand behind its dealers, and it is not surprising to know that a majority of its dealers have been handling their cars for more than 5 years and that the rule generally works out that the best dealer is the one that has handled their car the longest.

In reviewing trade conditions over the past year, Sales Manager Howard reports a big increase in business in cities, this being led by New York, which has experienced an increase of 44 per cent over the previous year. Other cities following in line, but with lesser increases, are Philadelphia, Boston, Chicago, Minneapolis, Detroit, etc. With practically all of the dealers closed car business has increased, as it is now possible to use these types approximately 8 out of the 12 months of the year.

April was the biggest month in its history for the Chalmers Motor Car Co., its shipments totalling 1,568 cars, as compared with 1,111 in October. To date the company has finished the manufacture of its large six model and has fewer than 1,000 of the little sixes to build. It is expected that the company will complete its year by June 1.

The Chalmers has been one of the two companies fortunate enough to be producing what is known as the small six-cylinder car in large quantities this year, and has experienced the country-wide demand that has been so general for this type of vehicle. The company practically has had a steady year since it began production last fall, and has been forced to keep its factory at full capacity and to work some of the departments at night since the first of the year.

A characteristic of the business has been the heavy winter sales, which have been well ahead of those in previous years, so that instead of the factories going down in December they were worked at capacity. There has been a 50 per cent increase in closed cars and although heretofore the sale of closed types has been restricted to upwards of fifteen cities, this year's sales have been scattered over fifty or more, although the original fifteen larger centers naturally have taken the majority. Closed car types have increased considerably in towns such as Youngstown, O.; San Antonio, Tex., and others of corresponding population.

Hugh Chalmers, president of the company, reports that there is less concentration of selling at certain seasons of the year than characterized the industry of 2 years ago. There still exists such periods of concentration, as early fall, when new models were announced, and also the spring months, when deliveries are quickened by weather conditions, but in other seasons of the year sales are spreading themselves more evenly. Some dealers have done 15 per cent more business between November 15 and January 15 than heretofore, a condition partly explained by increased business in closed cars.

A characteristic of the past year with the Chalmers company has been the assistance they have given their dealers in disposing of second-hand or used cars taken in in trades. This concern, like many others, recognizes that trading has become a legitimate part of the dealers' business and that its success or failure depends on the ability of the dealer to handle it properly. Of 250 Chalmers dealers a great many have been induced to entirely separate the business in new cars from that in used cars. The company endeavors to have its dealers do this, either by carrying the used cars in a separate department in the same building with the new ones, or, better still, if conditions warrant it, opening a separate store for the old cars. In such cities as New York, Philadelphia, Boston, Pittsburgh, Omaha, Buffalo, Sioux City, Des Moines, Denver and Minneapolis the dealers have separate departments on other floors for used cars, so that they are not shown side by side with the new machines. Separate stores for handling used cars are maintained in Chicago, St. Louis, Los Angeles, Memphis and Columbia, S. C.

The Used Car Problem

The company has conducted a persistent campaign all winter, assisting its dealers in the handling of used cars. This campaign has been based on the assumption that used cars constitute a big factor in a dealer's business and the Chalmers people have aimed to demonstrate to their dealers that they should concentrate on selling a new car rather than on buying an old one. They have recommended placing a separate salesman in charge of the used car business and have gone a step further in having this person consulted on

the question of allowances to be made on used cars taken in on trades when new cars are sold.

After starting production towards the end of 1913, the Hudson company has been operating at schedule ever since and has today practically completed its 1914 output of 7,000 cars, made up of 4,500 of its light six models and 2,500 of its larger six. This concern has had one of the most successful seasons for companies selling cars at \$2,000 or under, and President R. D. Chapin states that by June 1 not a single Hudson dealer will have any cars on his floor.

Mr. Chapin, who is a keen student of financial conditions and who leaves no stone unturned to keep his finger on the pulse of public demand, is not concerned, so far as the motor industry stands, relative to the financial tightness of the last year. This has not affected the motor industry and is explained by the fact that today the motor car is so dominating a factor in life that the business man insists on it. The general labor situation throughout the country is not good and hence many mercantile lines have suffered a business shrinkage because of the cut in buying capacity brought about by unfavorable conditions in the working world.

Mr. Chapin looks for good crop conditions throughout the country and going on the assumption that "business always follows money tendencies" expects that 1915 will be a bigger season than 1914, and his concern is cutting its cloth accordingly.

Hudson Expansion

During the year the Hudson company have very widely expanded its field of sales, embracing many smaller towns which heretofore were left to the low-priced car. The company finds that the closed car field has extended very much, particularly in northern states where the number of months the car can be used has been increased by the closed bodies. There is a considerable awakening in the southeastern sections of the country, brought about to some extent by the fact that the people in that section are awakening to the possibilities of their land value. Mr. Chapin believes that a potent factor in the success of any company depends on the ability of that company to build the type of car that the people most desire, and that one of the pertinent factors in success is the ability to directly diagnose the changing demands of the people.

E. R. Benson, vice-president in charge of sales of the Studebaker Corp., says that this year is the largest in the history of this company since it entered the motor field and that January, February and March of this year were the largest first quarter of any year. Production of the company's four-cylinder car at \$1,050 was started October 15, and has been kept up steadily every day since then. This car is at present being produced in what is known as plant No. 3 of the Studebaker Corp., located adjacent to the Detroit

river. Four thousand five hundred men are employed at this plant. The Studebaker six is manufactured in plant No. 1, located out North Woodward, and here 3,200 men are employed. Of the two models, the demand for the four naturally exceeds that of the six, but increased demands for sixes are found particularly in the large central agricultural states such as Ohio, Indiana, Wisconsin, Illinois, Minnesota, Iowa and the eastern end of South Dakota. In Ohio and southern Indiana some of the leading Studebaker dealers report that they are selling one-half of their output of sixes to the farmers.

Selling the Old Cars

The necessity of trading used cars in part payment for new ones has been recognized by the Studebaker company and the home office has aimed to control distributors in this work by recommending that a selling option be taken on the old car on the basis of securing a buyer for it and giving the car free floor space until sold. Several of the largest dealers do not take trades, but operate entirely on this optional business and do not charge the customer any commission for making the sale on the old car. As a result, such dealers are practically free of used cars at the present time. In cases where the option asked by the dealer on an old car is too low, there has been a marked tendency to lose the sale rather than stock up with used cars taken on at too high a figure.

The Studebaker product in America is at present distributed through its twenty-two branch houses working through its army of dealers and sub-dealers, 80 per cent of whom are exclusive Studebaker companies. Of the twenty-two branches only three sell on retail, these being Detroit, Atlanta and Los Angeles.

This company has built up a creditable export business, owing to its previous world-wide trade connections in its vehicle trade, and reports a good demand for sixes in the British Isles, South Africa and South America. Naturally its export trade is greater with the four-cylinder than its six-cylinder car. The Studebaker plants have been operating without any shutdown all winter, and several departments have been put on night work for the four-cylinder model.

To date the Paige-Detroit Motor Car Co. shows an increase of 106 per cent over the business of the first 4 months of a year ago, a condition partly explained by the increased production made possible by the large new factory which it moved into early in the year. Here are the relative figures of production for a year ago and this season:

	1913	1914
January	124	329
February	213	459
March	354	807
April	502	1,228

Part of January and February were taken up in moving and the production was correspondingly cut down. The factory is working on an output of 1,400 for May. April was the biggest production

month in the history of this company and if the 1,400-figure set for May is obtained it will establish a high-water mark. The factory is being worked four nights a week in machine shop departments as well as Sunday forenoons.

General Manager Bourguin, in surveying the future of the motor industry, claims that if crops are good this year there will not be any limit to the sale of motor cars for next season. Today conditions for 1914 crops are better than for years, and in many sections of the country where crops were poor last year, such as Kansas, there is more ready money than might be expected. The Kansas farmer husbanded his resources last year, and while they were forced to sell cattle because of the dry season, yet they sold them at a good market. They saved the money and this spring found many of these farmers with more funds on hand than in some previous years where finances were not so well managed.

Business Conditions Explained

Business on the Pacific coast is poor, Texas is poor in many sections, but many of the large cities, such as Chicago and Minneapolis, are particularly strong. The lake states of Ohio, Michigan, Indiana, Illinois and Wisconsin are specially strong buyers at present. Many points in Kansas and Missouri are a little slower than the lake states. At the Hupp factory the present schedule of seventy-five cars a day is being carried out and the company is prepared to reach 3,000 per month if necessary. To date Sales Manager F. J. Mooney states that the company has kept steadily ahead of its 1913 output and expects to reach its 12,000 total for the current season. The first 4 months of this year have been considerably better months than the corresponding ones of a year ago. Beginning with production, October 1, 1913, the factory has been operating much more steadily than ever before, and while seasons have changed as compared with a year ago, April being a poor month, the total has held up more evenly than heretofore.

The Hupp company always has been a large exporter of cars and consequently has experienced the same condition throughout the slack months of American buying that other exporters have, viz., that the export trade fills in these intervening depressions and makes it possible to keep production standard.

Sales Manager Mooney reports a strong trade with South America, good trade to Australia and Africa, in spite of the general depression that has been felt financially in South America, in many sections of Europe and in parts of Africa.

Domestic business in Hupmobiles has increased perceptibly with the farmers during the past year, some of their largest dealers being in such agricultural states as Texas, Nebraska, Minnesota, etc. In some of the farming sections, notably Minnesota, there is considerable demand

from the agricultural classes for cars not fitted with electric starting and lighting, this situation with Hupp dealers being the same as that with other dealers in this state. In other sections the electric equipment is generally specified, even with farming communities.

The great Ford plant, with its 15,000 workmen, is operating on a schedule of approximately 1,100 cars per day. One day in February it is reported 1,636 cars were manufactured and on April 30, 1,212

were manufactured in 8 hours, or at the rate of two and one-half every minute. The total shipments for April were 30,470 cars, a record month for the company, and to date 150,000 cars for the 1914 output have been produced. The manufacturing year ends on September 30. This plant has made amazing progress within the last year, chief of which are the enormous new shipping building now nearly completed, and the new progressive system of chassis assembly.

Prosperity the Talk in Moline Plants

Production Keeps Car Companies Busy

By C. G. Sinsabaugh

MOLINE, ILL., May 9—Prosperity talk is heard at both the local plants, Velie and Moline-Knight, and at the present time both factories are rushing 1914 production. Reports from all sections of the country show that general business is picking up and of course the motor industry is feeling the effects of it and will continue to do so from now on to the end of the run. Velie was particularly busy this week because of the invasion of Illinois and Iowa dealers, along with their prospects.

The Velie celebration was rather unique. Invitations were sent to all Iowa and Illinois agents of the company to come to the factory and bring their prospects with them. This they did and Friday and Saturday were given over to the entertainment of the visitors. The result of the roundup was a nice bunch of orders; indeed, several of the enthusiasts drove their own cars home.

Moline Plant Busy

Having struck its stride, the Moline-Knight plant is settling down to steady production and the sleeve-valve-motored cars are being turned out at the rate of three a day right now, this being an increase of one which has been made only recently. The shops are being run 12 hours a day, while the automatic machines are being run at night. More help is wanted and advertisements are being placed in outside newspapers for skilled help.

Factory Superintendent Grunewald points with pride to his automatic machines and makes the claim that this plant is the only one in the Knight group which is using automatic machinery in the production of all typical Knight parts such as sleeves, cylinder heads, pistons and block castings. This method of manufacture has resulted in the saving of from 50 to 60 per cent in the matter of time.

The company has on hand now about 100 of the poppet valve models which are to be cleaned out at once by means of a reduction in price from \$1,950 to \$1,550.

The reason for this step is that the room they take up at the factory is needed for manufacturing purposes. It is denied positively that a cheaper model will be brought out.

Not Seeking New Agents

No more Moline-Knight agents are being appointed, for the company finds it has all it can do to satisfy the dealers it has now. It is working on production rather than perfecting its sales organization to any greater extent than it is at present. An interesting angle is that the demand for the new cars is not confined to the big cities but also is spread in the rural districts. The bulk of the business is being done in the middle west and in the east and so far no effort has been made to line up the south. The demand for wire wheels is in excess of that for wood wheels and many of the wire wheels are going into the country districts.

Velie has 40 per cent more dealers working this year than last, there now being 385 enrolled as against 265. There are more prospects than ever but these are not being closed as rapidly as they would be were it not for the general business conditions that existed the first 3 months of the present year. Now, however, there has been a marked improvement in conditions in the rural districts and this is having its effect on Velie business.

Velie Company's Production

The Velie company started out to make 3,200 cars for 1914, but will manufacture 2,500, a reduction made necessary by the bad weather this spring and the general financial slump of January. This has been noted particularly in Texas where there has been a drought, followed by floods and bad roads. Now there is every indication of a bumper crop, so the outlook in the southwest looks much better than it did a couple of months ago.

The company's 1914 line consists of a 6-50 at \$2,350, a 4-45 at \$2,000 and a 4-35 at \$1,500. In the plans for 1915 it is likely that the 6-50 will be discontinued, but this does not mean the dropping of the

six-cylinder. Chief Engineer Rose is working on a six for the coming season. One 1915 model is out now. It is known as model 11 and is the successor of the 4-35. The main changes are in bodies, while the wheelbase has been increased from 113 to 116 inches.

Velie trucks are moving fast and the business in this line is 50 per cent better than it was at the beginning of the year, with the 1 and 2-ton trucks having the call. In 1913 250 trucks were made, all

of them 2 and 3-ton, but on this year's run faster progress is being made. So far 175 have been turned out for 1914 and the year does not close until September 1.

It has been discovered that Arizona and New Mexico are particularly good fields for the commercial vehicles and Velie seems to have gotten in particularly strong among the mining operators who find the motor truck of great value in the transporting of supplies to the mines and the carrying of ore.

Wisconsin Concerns Most Optimistic

Reports from Mitchell, Case, Jeffery and L. P. C.

By H. A. Tarantous

RACINE, Wis., May 9—The three motor car factories in this city look prosperous, the managers talk optimistically and everyone connected with the factories are looking forward to a bigger year in 1915 than they had in 1914, although in every instance the 1914 business was far in excess of the 1913. The Case, Mitchell-Lewis and the L. P. C., the last named maker of Lewis cars and in the field but a short time, report exceedingly good business for 1914, and in the case of the old-established concerns preparations now are under way for the 1915 models.

The business of the Case company has not fallen off in any territory. The east and extreme west never have been worked much by this concern. Buyers of Case cars are those men who stand by Case machinery and many farmers of this country use some machinery made by the Case company. Three models were offered at the beginning of the 1914 season, the 25, 35 and 40, and the factory began working on a production basis of 3,500 cars. Not until these cars are cleaned out of the factory will definite word of the 1915 models be given. At present the last batch of the 1914 cars is being finished and expected to leave the factory before the end of June, since the Case company does not make yearly announcements the new series may not be heard from until after that date.

A number of new dealers were taken on during the past season and at the present time all territory is well taken up. It is safe to say that the busy months for the Case company are those when the farmers are buying. No production plans for 1915 have yet been announced.

Down at Racine Junction the Mitchell-Lewis and L. P. C. companies are shipping to capacity daily. The former manufactured fours and sixes and 60 per cent of the business of the year was six business. The four sells for \$1,595 and the little and big sixes at \$1,895 and \$2,350 respectively.

Mitchell Completing Run

There are 1,000 1914 Mitchell cars coming through now and these will be shipped

by June 1. The 1915 production has not been decided upon and many of the new cars are on their way through the plant. This concern has a large number of customers who buy their cars year in and year out because of having had satisfactory service from Mitchell wagons.

Mitchell Conditions

Trade conditions have interfered slightly with Mitchell business. The lowest sales were reported from the coast, while the east has shown a great increase. A number of the southern states have been disappointing. The weather conditions in Texas have been very detrimental to the motor car business in general. The floods, cold and then rain in this territory have made buying slow. The sugar tariff has made New Orleans a slow city and the buyers there need their money for merchandise other than cars. Atlanta sales for the Mitchell-Lewis company have been far ahead of 1913 and the general rise throughout the country has nullified the drop in Texas and parts of the south. More business was done in March than in any other month of the 1914 season and this month was much ahead of March of 1913. In April of this year forty more cars were shipped than in March and a comparison with 1913 would show a great increase.

At present there are about 1,500 men in the Mitchell shops, and these employees started the work on the 1914 cars in November and between that time and now it was necessary to do much night work. No dealers' troubles have come up and all territory is well covered.

The L. P. C. company, maker of the Lewis six, which sells for \$1,600 in six-passenger touring form, has been shipping cars since March, having begun its production of 500 cars in December. With 200 men and ample shop facilities the proposed output should be well on the way by July. No plans have been formulated for a new model, for the present six was designed with 1915 ideas incorporated.

Jeffery Plant a Busy One

Jeffery, at Kenosha, is shipping at the rate of about thirty-two passenger cars a day and eight to ten commercial vehicles. A production of 7,000 cars was planned for the 1914 season and as fast as the remaining few come through they are shipped to the dealers. Definite plans have been laid for a 10,000-car output in 1915 and some of the new models now are in the course of construction and will be announced about the middle of June, when all the 1914 cars will have been shipped.

The Jeffery company's 1914 cars are a four, the model 93 selling at \$1,550, and a six, the model 96 selling at \$2,250 in five-passenger touring form. Seventy-five per cent of the 1914 business was fours.

Reports from various dealers throughout the country show that in nearly every territory increased business was done in 1914 and despite adverse conditions the Jeffery company, through Assistant Sales Manager Hill, states the coast and the south have shown up very well. Nearly every dealer, according to telegrams received by the company, expects to double the May business over April.

The total March business was more than double that of the previous March and April of this year was 53 per cent ahead of March. Three weeks ago night work at the Jeffery plant ceased and business resumed its normal speed. In order to turn out the 7,000 cars planned for 1914, 300 extra men were taken on.

Outlook Seen Through St. Louis Eyes

Business Reports from Moon and Dorris

By Darwin S. Hatch

ST. LOUIS, Mo., May 8.—St. Louis is the western outpost of motor car manufacturing, and though the industry is represented by only a few manufacturers of passenger cars, their location is such that they present a slightly different angle from that of makers further east. The two concerns located in St. Louis, the Dorris Motor Car Co. and the Moon Motor Car Co., are probably less affected by the financial condi-

tions and fluctuations in Wall street values than are some of the more eastern concerns. But, on the other hand, they are as intimately, if not more intimately, concerned with conditions which affect the purchasing power of the former. That is, if the crops generally are good, these concerns are little affected by other causes. That the St. Louis concerns were affected by the strained financial condi-

tions of the past year is admitted, but it is evident that they have more than recovered any ground that was lost due to matters financial. Both concerns expect a considerably increased production for next year, particularly if agricultural sections throughout the west and central west are prosperous.

At the Moon plant the business from September to January last was 36 per cent greater than that of the corresponding month a year ago, and during the 3 succeeding months of February, March and April there was a 27 per cent gain over those months of 1913. The 1913 production of 1,540 cars will be more than out-distanced before the end of the production season in October. In fact, there have been 1,200 cars built up to May 1, and it is expected that 1,800 probably will be the total figure. At present the factory is running practically at full force, and is 3 weeks behind in its orders. As to whether the company was seriously affected by the financial stringency may be judged from the fact that during the latter part of 1913 a 32 per cent dividend was declared.

An unexpected feature of the present selling season, according to the Moon sales forces, is the success of the six-cylinder car. This is the first year for this car, but it is stated that fully 6 per cent of the sales have been sixes. In spite of the success with the new six-cylinder, or perhaps because of it, the company will bring out a small four-cylinder within a few weeks to sell at about \$1,250.

Moon's Selling Territory

A canvass of the territory shows that during the past year Iowa has been the best sales section, and as to individual cities Philadelphia and Brooklyn have proven exceptionally good territory. The sales in the far south possibly are somewhat curtailed, owing to the factory's refusal to turn out cars with 60-inch tread.

The Dorris company has not been affected permanently by the furies of last winter. The sales dropped back approximately 15 per cent, but picked up to such an extent that the 1914 production is practically sold out, there being only five cars to be disposed of.

This company occupies a rather unique position in the industry in that it has been marketing the same car with no changes, except minor refinements, and the same number of vehicles for many years. Its output of 300 pleasure cars and 200 trucks, making 500 vehicles in all, has been a constant one, so that until recently there has been no need for its increasing its manufacturing facilities. However, in expectation of increased business in the near future, a new factory has been erected within the past year, and production for 1915 probably will be considerably increased. The company has sixty-one dealers and directs its efforts mostly toward the west.

The Dorris company has been rather

fortunate in that practically all of its dealers are old standbys, nearly all of them having been identified with the sales organization since they commenced to handle cars. No dealers were lost during the general slump in trade conditions, the only defection being those dealers that dropped the motor car business completely. The slacking up ended some 3 months ago and picked up within the past 2 months, there being a slight increase in April and May of this year as compared with the corresponding months of a year ago. Throughout the year the company has been operating with 80 per cent of the men on full time.

In the field of parts and accessories St. Louis is represented chiefly by the McQuay-Norris Co., manufacturer of Leak-proof piston rings. Inasmuch as the output for motor car engines is a comparatively small percentage of this concern's production, its experiences during the past year cannot be taken as a criterion of the motor car industry as a whole, but probably sheds light upon the effect of the re-

cent financial conditions upon manufacturers in general. According to President Norris, no bad effects were discernible. In fact, sales have increased by leaps and bounds and at an increasing rate each month. The factory is running 24 hours a day with between fifty and sixty employees in its somewhat restricted quarters and is away behind in its orders; no contracts are being made for delivery in lots earlier than September 1. A new two-story and basement factory, 100 by 135 feet in size, is under construction, and it is expected to commence operations in the new plant in August. This will greatly increase the manufacturing facilities, and the extremely modern building is being planned for the most up-to-date efficiency methods. The new plant will be more than double the capacity of the present factory.

A great deal of the McQuay-Norris deliveries are by parcel post, and for this service the company has installed a cycle-car with a delivery body, which forms the double function of giving rapid service and acting as a striking advertisement.

Exports and Imports for Last March

Shipments Abroad Increase in Value

WASHINGTON, D. C., May 9.—Figures showing the exports of motor cars during March and the 9 months ending March, together with comparative figures, were issued today by the bureau of statistics. They show that during March fifty commercial cars, valued at \$63,932, and 3,538 pleasure cars, valued at \$2,984,915, were exported.

During the same month of last year 108 commercial cars, valued at \$191,223, and 2,734 pleasure cars, valued at \$2,718,518, were shipped abroad. During the 9 months period the exports of commercial cars decreased from 653, valued at \$1,198,590, in 1913, to 543 cars, valued at \$861,654, in 1914. The exports of pleasure cars, however, showed a marked increase from 16,677, valued at \$16,563,779, in 1913, to 19,928 cars, valued at \$17,904,002, in 1914.

The exports of parts, not including engines and tires, increased in value from \$604,469, in March, 1913, to \$701,038 in March last, and from \$3,587,805 to \$4,923,339 during the 9 months' period. The exports of cars, by countries, during the periods under consideration, were as follows:

Motor Cars—	No.	March		No.	Value.
		1913.	Value.	1914.	Value.
France	83	70,190	164	98,427	
Germany	95	108,713	361	264,203	
Italy	36	30,853	23	13,664	
United Kingdom	633	462,696	819	637,884	
Other Europe	219	198,091	590	498,142	
Canada	840	1,082,076	500	431,029	
Mexico	18	49,762	21	24,139	
West Indies and Bermuda	43	45,334	36	34,682	
South America	251	294,779	129	114,276	
British Oceania	304	292,110	561	491,850	
Asia and other Oceania	210	190,277	196	185,647	
Other countries	101	89,851	188	154,904	
Total		2,842	\$2,900,741	3,588	\$3,048,847

Motor Cars—	Nine months ending—		No.	Value.
	1913.	Value.		
France	501	\$ 399,600	700	\$ 509,241
Germany	392	382,353	951	877,347
Italy	225	200,498	234	163,806
United Kingdom	2,747	2,090,585	5,600	4,460,803
Other Europe	1,045	907,601	1,741	1,404,909
Canada	4,919	6,055,030	2,687	3,552,406
Mexico	240	475,921	154	241,667
West Indies and Bermuda	340	353,558	408	383,281
South America	2,195	2,441,906	1,592	1,812,860
British Oceania	2,341	2,177,218	3,077	2,658,621
Asia and other Oceania	1,542	1,479,519	1,664	1,617,970
Other countries	831	798,577	1,663	1,460,683
Total	17,330	\$17,762,309	20,471	\$18,765,656

Imports of cars show marked decline. The number imported during March, 1913, was forty-nine, valued at \$104,714, while in March last the number was fifteen and the value \$15,867. During the 9 months' period the number decreased from 618, valued at \$1,434,059, in 1913, to 245, valued at \$545,226, in 1914. On the other hand, the imports of parts, except tires, showed a large increase. The imports for March, 1913, were valued at \$15,236, increasing to \$90,928, in March last, while during the 9 months' period the imports rose in value from \$199,888, in 1913, to \$488,730 in 1914.

CAMERON COMPANY IN TROUBLE

New Haven, Conn., May 9.—One of the largest commercial failures in New Haven in years was recorded Friday of this week in the bankruptcy court when the Cameron company of West Haven filed a schedule showing that the concern owes \$121,998.38. Of this amount are secured claims amounting to \$91,858.50 and unsecured claims aggregating \$28,275.59. The assets are listed at \$48,631.47 representing real estate, due on open accounts and \$8.30 in cash in the bank. The real estate belong-

ing to the plant is subject to a mortgage to the Parmelee company and to Pierpont B. Foster. The Beverly, Mass., National Bank is a creditor to the extent of \$11,171.20. Wages now due the employees of the concern amount to \$1,328.51. The Cameron company removed to West Haven from Beverly, Mass., some time ago. Inability to raise the necessary capital is assigned as the reason for the failure of the company.

COLUMBUS BUGGY TO RESUME

Columbus, O., May 11—The New Columbus Buggy Co., of Columbus, which is the successor to the Columbus Buggy Co., has sold the plant and assets to Charles A. Finnegan and Eugene D. Hofeller, of Buffalo. By the contract of sale the new owners will take over all of the capital stock of the new corporation and will continue the plant in operation.

The creditors' committee which took the plant over almost a year ago, issued a statement in which it was said that the sale of the property was effected at a price almost double any previous offer.

In connection with the deal it was rumored that the E. R. Thomas Motor Car Co., of Buffalo, which was purchased by Mr. Finnegan a year ago, may be removed to Columbus and consolidated with the Columbus plant.

Mr. Finnegan in an interview said, "Our purpose will be to run the Columbus Buggy Co. on a larger scale than ever before. It is very likely that we will move the Thomas plant here and consolidate the two."

The sale practically guarantees the future of a plant which has been operated in Columbus for 42 years. Primarily it was a horse-drawn vehicle concern and later took up the building of electric and gasoline motor cars.

FORD LOCATES CLEVELAND PLANT

Cleveland, O., May 11—The expenditure of nearly \$600,000 by the Ford Motor Co. in a manufacturing and service plant to supply the Cleveland district is assured by the purchase of a large tract of land at Euclid avenue and East One Hundred and Seventeenth street. A building to house a plant for assembling Fords, a service station and sales rooms will be erected at a cost estimated at nearly \$500,000. Permission already has been granted by the city of Cleveland for the Belt Line Railway to enter tracks at the height of the second floor.

UNIVERSAL RIM CO. OBTAINS PATENTS

Chicago, May 11—The Universal Rim Co. has been granted patents Nos. 1,095,772, 1,095,771, 1,095,770, 1,095,935, 1,095,996, 1,095,775, 1,095,776, 1,095,777, 1,095,778, 1,095,779, pertaining to rims, which have been assigned by Joseph A. Anglada, Earl K. Baker and Charles Gilbert Haw-

ley. The rims represented by these patents have been in use for the past 3 years and the papers which were originally filed 4 years ago, were kept in the patent office awaiting amendments. All the patents relate to rims or improvements.

KLAXON AND PIEL IN PEACE PACT

New York, May 11—An agreement has just been completed between the Lovell-McConnell Mfg. Co., maker of the Klaxon, and the G. Piel Co., maker of the Long horn, whereby each company continues its present types of hand operated instruments under their several patents. The Lovell-McConnell company has agreed to allow the G. Piel company to develop and put upon the market a line of motor-driven electric horns of similar construction to the hand-operated Long horn at present made by the Piel company. The litigation between these companies has been discontinued. The H. W. Johns-Manville company will continue to market the instruments manufactured by the Piel company, as heretofore.

WILLYS APPROVES INCREASED RATES

Toledo, O., May 9—Approval of the proposed increase in freight rates authorized by the interstate commerce commission, is

given by John N. Willys, president of the Willys-Overland Co., of Toledo, O., and head of half a dozen other big companies. Mr. Willys recently wrote to the federal commission, in effect, as follows, regarding the proposed increase.

"After considering from every angle the matter now before your honorable body, pertaining to the general increase in rates, I am constrained to write and express to you my belief in the advisability of such action. I am convinced that conditions warrant it and that carriers are entitled to a larger revenue for the service they perform. So I would respectfully ask to be placed on record as not only not objecting to the increase but as strictly advocating it, notwithstanding the fact that it will mean a large increase in the expenses of my company."

DUNK BUYS FALCAR ASSETS

Chicago, May 11—A. O. Dunk, president of the Puritan Machine Co., Detroit, Mich., has purchased all the assets of the Fal Auto Co. of Chicago, from S. Winternitz & Co., auctioneers. This purchase includes all the patterns, tools, service parts, and other property formerly owned by this concern. This entire stock has been moved from the factory to the Detroit salesrooms and warehouses of the Puritan company.

Buyers of Knox Form New Company Sutton Interests To Make Fresh Start

BOSTON, Mass., May 9—The Knox Motors Co. of Springfield, Mass., is the name of the new company formed by the men who bid in the Knox property at the sale held in that city last week. Harry G. Fisk, treasurer of the Fisk Rubber Co., is president; Edward O. Sutton, who bid in the plant, is treasurer, and Attorney Charles H. Beckwith is clerk. All three serve also as directors. It is capitalized at \$2,500,000, with 12,500 shares of preferred and 12,500 common stock at a par value of \$100 each. The preferred stock carries a dividend of 6 per cent and no dividends will be payable on the common stock unless the net surplus equals 10 per cent of the par value of the preferred stock with interest before the dividend is declared. Each incorporator has subscribed for \$1,000 worth of preferred shares.

The stock is apportioned as follows: Preferred stock, real estate, 3,250 shares; machinery, 3,750 shares; merchandise, 5,500 shares; common stock, trademarks, 2,000 shares; good will, 500 shares; organizing and financing company, 10,000 shares. In organizing the new company \$250,000 worth of preferred stock has been reserved and is offered to stockholders of the Knox Automobile Co. and to furnish an opportunity to make good the

loss in value of the old stock a bonus of 100 per cent of common stock of the Knox Motors Co. is offered with it to these stockholders. This exclusive offer expires May 20.

The company intends to continue the building of pleasure cars, fire apparatus and tractors. All the models now on hand will be sold out so that the company will start with a new slate. An estimated inventory shows that the Knox Motors Co. will start business in a financial condition about as follows:

Assets—Real estate, \$325,000; machinery and equipment, \$375,000; agency equipment, \$1; patterns and drawings, \$1; merchandise, \$750,000; cash, \$50,000; good will, patents, etc., \$1,250,000; treasury stock (common), \$250,000; (preferred), \$250,000; total, \$3,182,704.

Liabilities—Capital stock (preferred), \$1,250,000; (common), \$1,250,000; notes payable, \$250,000; surplus, \$500,000; total, \$3,182,704.

Mr. Fisk and Mr. Sutton are both sons-in-law of the late Alfred N. Mayo, to whom the Knox company owed almost \$1,000,000 and to whose death was due the present financial troubles of the old company, because the estate had to be settled up. Whether Attorney John P. Wright, who represented other creditors, and who objected to the sale being allowed last week, will carry out his threat to ask the United States district court at Boston to declare the proceedings invalid remains to be seen.

Shock Absorber Patent Suit Decided

Velvet Given Decision Over J. M.

CHICAGO, May 8—The United States district court for the northern district, sitting in Chicago, and with Judge Sanborn on the bench, decided today that the J.M. shock absorber made by the J.M. Shock Absorber Co., Philadelphia, was an infringement of the Velvet shock absorber made by the Blackledge Mfg. Co., Chicago.

The suit was begun by the Blackledge company in April, 1913, against Albert J. Dueth and Alexander J. Dueth, doing business as the Alfredal Co. in Chicago and handling J.M. shock absorbers. Judge Sanborn stated in his decision that the J.M. is like the Velvet device in means, elements, function, operation and result, and gave the Blackledge company the sole right under its patent, claiming J.M. an infringer and asking it to vacate.

The suit involved patent No. 988,229 on a shock absorber for motor cars, issued to Charles A. Tilt on March 28, 1911. The Velvet is the latest form of absorber represented by this patent. It is held this patent is held by the Blackledge company, which claimed that the J.M. absorber which is made under patent No. 1,015,682, issued to L. P. Jaquet on January 23, 1912, is a direct infringement.

Tilt, it is claimed, solved what other inventors failed to solve, the elimination of sidesway, and at the same time preventing excessive shock being transmitted to the car and passengers. Both Tilt and Jaquet solved the sidesway problem and produced devices very much similar. The Tilt device consisted essentially of two coil springs operating in cylindrical cylinders and having a guide in the form of a rod inside each spring, with metal sleeves which may slide up and down over the rods within the range of spring vibration.

Judge Sanborn in his decision said: "The J.M. shock absorber has the same elements as the Velvet, but is different in details. It has everything found in the Velvet as well as many other good things."

The Chicago attorney S. E. Hibben, representing the J. M. company, stated that an appeal would be made by the New York attorneys of the company. The Blackledge company will file a decree asking for a preliminary injunction restraining the J. M. company from further making and selling the infringing shock absorber.

RUSHMORE ANNOUNCES NEW STARTER

New York, May 11—The Rushmore Dynamo Works of Plainfield, N. J., has brought out a new starter which weighs only 19 pounds and is but 4.25 inches in diameter. This machine already has been adopted for more than 10,000 moderate-sized cars by European manufacturers, according to the announcement of the Rushmore company. This is a series-wound

electric motor and will develop a maximum of about .7 horsepower. It is intended for engines up to four-cylinder 4 by 5-inch size.

The lines along which this latest Rushmore starter is constructed are very similar to the large machine. The starting motor is only engaged with the flywheel when starting the engine. The principles of its construction are simple, the armature being held normally out of line with the pole pieces by means of a compression spring in the commutator end of the shaft. When the switch is closed the armature is drawn by the magnetic attraction of the pole pieces into its working position, thereby engaging the pinion with the flywheel. To hold the armature in position against the pressure of the spring it is made a little longer than the pole pieces so that a certain amount of end pull is exerted while the armature is turning.

When the engine starts the motor is relieved of its load and following the principles of the series-wound motor, in which the field current decreases with a decrease in load, the current drops to practically nothing, allowing the spring to automatically push the armature and pinion out of action before the speed has time to increase appreciably.

FROST TO MAKE KNOTSON STARTER

Galesburg, Ill., May 12—The Automatic Devices Co., owner of the patents of the Knutson automatic engine starter, especially for use on motor cars, has closed a contract with the Frost Mfg. Co. for the manufacture of 6,000 Knutson starters. The Knutson starter is a device operated by a spiral spring inclosed in a casing. It is attached to a car by bolting on a supporting brace directly in front of the radiator. By pressing a small button located on the footboard a spring is released, thus starting the engine. The spring immediately rewinds and locks itself so that it is ready for another start. The officers of the company are: F. N. Clark, president; R. C. Wharff, vice-president; E. P. Robson, secretary.

PILOT ANNOUNCES BIG SIX

Richmond, Ind., May 12—The Pilot Car Sales Co. has given out the details of its new Pilot 75 for 1915, which is an additional chassis model to the Pilot 60 and the four-cylinder Pilot 50. The two latter will be continued for the 1915 season and the 75 will be added in two, four, five, six and seven-passenger bodies at \$2,885. The engine is a six-cylinder Teetor motor, 4½ by 6, and is said to show 90 horsepower on brake tests, although the length of time it will deliver such excessive power is not mentioned. The car has a

cone clutch, three-speed gearset, straight-line drive, Timken axles, Eisemann dual ignition, center control with either right or left drive as desired. Tires are 37 by 4½ and the wheelbase 132.

Equipment is the feature and includes, beside the electric starting and lighting system, Warner autometer, 8-day clock, Stromberg or Carter carbureter, electric horn, power tire pump, Jiffy curtains, rear-view reflector, license brackets, cigar lighter and work lamp and motometer. A Pilot feature is the Dayton automatic lamp control, which is stock equipment. This is arranged to turn the right head lamp as the wheels are turned to the right, the left one remaining stationary, and vice versa. This gives light around a curve and also straight ahead. Wire wheels and Westinghouse air springs are offered as special equipment.

STROMBERG WINS FROM ZENITH

Chicago, May 13—Judge Sanborn, sitting in the United States district court for the northern district of Illinois, today enjoined the Zenith Carbureter Co. of Detroit from directly or indirectly infringing the Ahara patent No. 684,662, held by the Stromberg Motor Devices Co., which two companies have been in patent litigation for some time. The Zenith company is enjoined, unless it gives within 5 days a \$20,000 bond to the clerk of court, conditioned upon the payment of all profits made by the Zenith company by reason of the sale and use of carbureters in infringement of the Ahara patent. This is further conditioned upon the filing in the court of sworn statements of sales by the defendant to be submitted to the court at Madison, Wis., during the first week in each month covering the sales of the previous month of all carbureters made and sold by Zenith, together with factory numbers of the carbureters.

The Stromberg company was denied an injunction as to the Richards patent No. 791,501, upon which it also made application for an injunction.

PREDICTIONS BY HUGH CHALMERS

Kansas City, Mo., May 9.—Hugh Chalmers, president of the Chalmers company, does not believe the motor car of the future will witness many changes over its present form. Mr. Chalmers is of the opinion that the motor car has reached its highest development and that the car of tomorrow will be unimproved over the car of today.

"Of course, some inventive wizard may come out with a new battery or a satisfactory petroleum engine and cause a few changes in the motor itself," he said while here last week to address the Knife and Fork Club at its regular monthly dinner. "But I doubt it. The motor car has advanced swiftly and surely to its present high plane and I do not believe the future will see it changed to any great extent."

Routes and Touring Information

Motoring in the Ozark Mountains Furnishes New Sensations

By L. S. Munsell

ONE of the joys of motoring is the opportunity which it offers of striking out into untried paths. This opportunity a party of enthusiasts enjoyed on a recent camping trip through the northwest Ozarks.

This region, locally known as the Ozark uplift, is just being discovered. The reading public has imbibed some romantic ideas concerning the Ozarks from the deservedly popular novels of Harold Bell Wright, but practical people, bent on pleasure or profit, are only lately beginning to realize that these mountains, occupying a large part of Arkansas and extending into Missouri and Oklahoma, have treasures of many kinds to offer.

A Recent Discovery

The lateness of this discovery is due, in part, to their inaccessibility, and in part to the fact that their rich resources have not been properly exploited. Rich veins of coal, lead and zinc lie untouched; there are acres upon acres of virgin timber; while the high prairie uplands are especially suited to farming and fruit raising. These commercial opportunities are beginning to attract capital, and railroads are now being pushed into what is practically a wilderness.

But it is another aspect of this little known region that attracts the motorist. There are any number of delightful spots, hidden in its hills and valleys, where one may spend a summer vacation. There is no purer water in the United States than the cold, sweet spring water gushing out from the side of a hill almost anywhere where one may care to stop. The temperature is mildly uniform and the scenery is charming, not with the wild picturesqueness of the Rockies, but with a less barren and a more quiet beauty that is equally appealing, in its way.

Not all of the Ozark region is accessible to motorists, but there are excellent roads through the northwest and on south along the western line of Arkansas. For this thanks largely are due to the energetic work of the Ozark Good Trails Association. The old trails through the moun-



THE MOTOR CAMP IN THE OZARKS



GOOD TOURING SECTION OF THE OZARKS

tains have been graded, widened, and marked, and in many instances they have been materially shortened by blasting out a more direct route. The work already done is considerable, but the association is even more ambitious for the future. Its great objective aim is to make a broad, smooth boulevard from Kansas City, Mo., to Fort Smith, Ark. Already it is becoming quite the thing for parties from Kansas City to motor to Monte Ne, Ark., and spend a week's end.

Enter Through Oklahoma

Our party entered the Ozarks at Grove, Okla. From there we went northeast to Southwest City, Mo., then south 30 miles through the Spavinaw hills to Siloam Springs, Ark. We had some experience in climbing rocky hills and had held our breath more than once in ecstasy at the view that lay at our feet after such a climb, before we entered Southwest City,

but there had been no beauty to compare with the beauty of that winding mountain road down the Spavinaw to Siloam.

The Ozark Trail Association had done good work here and the road bed was well graded. Sometimes we were shut in narrowly on both sides by dense woods. Occasionally, in a clearing in the timber, nestled a mountaineer's cabin, primitive and poverty-stricken, with a half-dozen children hanging on the fence to watch us go by. And every now and then a vista opened up before

us disclosing a magnificent stretch of green-clad hills and valleys. There was beauty all about us, constantly varying in its aspects.

Siloam Springs is building up a considerable reputation as a health resort. More and more people come there every year to drink the water from Siloam spring and from the Twin springs. Some make the little city the starting point for fishing or camping trips on Flint creek or the Illinois river, or for an excursion to Dripping springs, an unusual and beautiful spring about 7 miles south of Siloam.

Mules Are Numerous

It is 30 miles through Spring River valley from Siloam Springs to Bentonville. This is an interesting drive and a good road for motor cars. The only danger that threatens is the unexpected meeting of a mule team around some curve hidden by shrubbery. The people here drive nothing but mules. Magnificent specimens they are, too, but motor cars are strange and frightful apparitions to them, and a team of big mules, meeting one unexpectedly, is more likely than otherwise to hurl themselves over the engine into the front of the car.

Spring River valley is especially attractive from a camper's point of view. We camped here in an ideally beautiful spot. Broad shelves of smooth gray granite served admirably for kitchen and dining room. A spring gushed out in picturesque fashion from under overhanging rocks, and nestled back in the bluffs was a house, reached by a hanging bridge suspended over a deep ravine.

Emerging from Spring River valley we

came upon rich, high prairie lands set to large orchards of peach and apple. Bentonville and Rogers are thriving towns, Rogers, especially, bidding fair to become the commercial center of this region.

But it is at beautiful Monte Ne, set in a cup-like hollow in the hills, where all charms converge. Colonel W. H. Harvey, "Coin" Harvey, of financial fame, has undertaken to make this a summer resort which shall be to Arkansas, Oklahoma, Missouri and Texas what Asheville, N. C., is to its contributing territory. The name means mountain water and the little pocket in the Ozarks practically is surrounded by clear cold streams fed by the many springs which flow 10,000 gallons a minute. As a result, the temperature is delightfully cool, even in midsummer.

Cold in the Morning

When we were there, in July, the mornings were so cold that we could see our breath. During the middle of the day, for a few hours, the thermometer sometimes goes as high as 84 or 85, but between 3 and 4 o'clock one can feel it grow perceptibly colder, due to the breezes blowing from the cold spring waters. Here at Monte Ne one has a wide choice of accommodations. One may camp, as we did, or he may avail himself of the excellent hotel service. One of the three hotels is situated by the side of a pretty lagoon and its guests are taken from the picturesque log depot to the hotel in a gondola. Colonel Harvey has completed two of the four club hotels he has planned, Missouri Row and Arkansas Row. Oklahoma Row and Texas Row are yet to be built. The architecture of these hotels is unique and the service is excellent. They are open the whole year. The protected location makes it a pleasant place even in winter and jolly Christmas parties gather round the big fireplaces.

From almost every camp we made we took one or more interesting jaunts on foot. Sometimes these spots of beauty or interest were accessible to cars, sometimes they were not. Two of these side trips out of Monte Ne are worthy of mention here.



CONCRETE PIER IN WHITE RIVER, PART OF NEW BRIDGE LOCATED IN BENTON COUNTY, ARK.

Vinola Wine ranch, owned and operated by the Stark brothers, is one of the show places of the Ozarks. Thirty years ago these brothers built a log cabin with their own hands on the slightly knoll, commanding a wide view of the White river valley, where the beautiful ranch house now stands. They believed that the sheltered hillsides were adapted to the growth of a special wine grape and their success has vindicated their judgment.

Horticultural Display

Mr. Stark is recognized as an authority on horticulture by the department at Washington and in his extensive grounds are to be found many foreign trees and shrubs. Specimens of everything of that kind imported by the government are sent to him for purposes of experimentation.

Another side trip took us to the White river and the big cement pier recently finished by the Kansas City and Memphis Railroad. The object is to throw a bridge

across the river and extend the lines into the eastern countries, a rich and virgin strip of marketable timber. This extension will, in all probability, be completed by another summer.

From Monte Ne and Rogers our road led north through historic ground, the scene of incessant fighting during 1862 and 1863. We found it a surprisingly good road as far as the old Elkhorn tavern. Around this tavern the 2-days' battle of Pea Ridge was fought, March 7-8, 1862, between the union forces under General Samuel Curtis, and the confederates under General Van Dorn. The barefooted young women who take you across the road to show you a box of relics picked up from the battle field will tell you how their grandfather and grandmother hid 3 days and nights in the cellar of the old house, which was at the time a wayside inn. A few rods northwest of the house are the monuments erected by congress to both the union and confederate officers who fell in this battle. It gives one a thrill to eat a noonday lunch in the very ravine where the heaviest fighting took place.

Roads Being Repaired

A short distance north of Elkhorn tavern we entered Washburn hollow, or Elkhorn hollow, as it is still called by the old residents. This 12 miles is not, as yet, all that could be desired as a speedway, but the Trails association is hard at work on it. At one place we were delayed for some little time by workmen who were blasting out a shorter and better route. There are no mosquitos through this region and practically no flies. Even cooking in the open, as we did, failed to attract this common pest.

It was blackberry season when we were there and we found the woods full of luscious wild blackberries. There was scarcely a mile, after we entered the Ozarks, that we could not have stopped and picked all of the berries we wanted. Wild raspberries and blueberries are also to be found in their season.

One of the interesting features along the trip was what the natives called "blowing springs." They are peculiar to the limestone formation of those hills and are rather common. They are rightly called "blowing" springs for instead of a stream of water gushing out from a hole in the rocks one encounters a stream of cold air, carrying a uniform temperature of about 34 degrees the year round. At high noon on a hot summer day it is refreshing to sit down before one of these springs. The wave of cold air may be felt 20 or 30 feet away from the mouth of the cave.

After striking the Missouri line one may go east by way of Noel and thence north to Neosho and Joplin, or work eastward to Exeter and then northeast through Granby to Joplin. The western route is more picturesque but it is more difficult and more or less hazardous. There



SPRING NEAR THE MUNSELL'S MOTOR CAMP

are one or two hills very hard to climb. Noel, however, is a beautiful spot, and is much frequented as a summer resort.

Joplin and Webb City lie on the outskirts of the Ozarks. They are the center of the largest zinc mines in the world, and despite their extent, a strike is unknown there. The roads in and out of Joplin are as smooth as pavement. They are laid with Joplin chat, a crushed white flint, the refuse of the mines. This refuse is piled up in veritable mountains, practically worthless where it is. If it could be laid down where it is needed for road building it would represent a large value.

It is not necessary to camp on a motor trip through the Ozarks. Good hotels are

to be reached anywhere within a day's drive. But one who has tasted the delights of camping would not exchange them for any other accommodations. A month's camping trip, sleeping out of doors, drinking the Arkansas spring water, and eating one's fill of wild blackberries will flush the veins with new red blood and put to rout legions of deadly microbes.

In any other way, too, the tourist will miss one of the most interesting features, the native mountaineers. Their shanties, set on logs, with a wide sweep underneath for the winter winds to whistle through, are to be found tucked away at all angles on the mountain sides. Our party camped for 2 days in the midst of such a

community. The people were typical Arkansawyers, as they called themselves. The women and girls were all barefoot, and it was easy to tell how many calico dresses they had by the high water marks on their necks. The men worked at the limekiln; the old women chewed tobacco and were shiftlessly discontent with their lot; the younger people were showing unmistakable signs of advanced ideas.

The route described is not yet logged but will be in the near future. Information concerning it may be had from the secretary of the Ozarks Trails Association at Rogers, Ark. It possesses scenic and historic attraction and offers opportunity for a unique and delightful summer outing.

Answers to Many Inquiries for Route Information

St. Louis, Mo.—Indianapolis, Ind.

ST. LOUIS, Mo.—Editor Motor Age.—Kindly advise the best route from St. Louis to Indianapolis via Chicago.—R. L. Smith.

Take the Alton way to Springfield, 117 miles, routing through Granite City, Mitchell, Alton, Chesterfield, Girard, Virden and Chatham. Springfield to Chicago should route via Starved Rock and to do this to Ottawa, 163 miles, you pass through Midletown, Delavan, Groveland, Peoria, Moss-ville, Chillicothe, Hollowayville, Peru and LaSalle. It is then 90 miles to Chicago over mostly stone or gravel road through Morris, Minooka and Joliet.

Forreston, Ill.—Donovan, Ill.

FORRESTON, Ill.—Editor Motor Age.—Please publish the route to Donovan, Ill., giving the mileage.—Subscriber.

It is about 20 miles to Dixon, then you follow through Ohio, Princeton, Hollowayville, Peru and La Salle to Ottawa, come south to Streator and turn east to Dwight, Reddick and Kankakee, thence about 25 miles further to Donovan. The entire distance is about 194 miles, a day's run, stopping at Ottawa for lunch and allowing time to visit Starved Rock and Deer Park.

New Orleans, La.—Clarksville, Tex.

NEW ORLEANS, La.—Editor Motor Age.—Is it advisable to take a trip to Clarksville, Tex., traversing the southern route? What emergency equipment would be necessary for my car? About how many miles could I make in a day, and what is the length of the trip? What is the condition of the roads?—A. G. Buchanan.

Motor Age would not advise you to make this trip. You would have to motor through Louisiana to Texarkana, then west to Clarksville, and Louisiana is not considered a "happy touring ground." We never have heard of anyone successfully completing such a trip. In such sparsely populated parts one cannot reasonably expect good roads, and this is very marshy country anyway.

Ponca City, Okla.—Joplin, Mo.

PONCA CITY, Okla.—Editor Motor Age.—I would like to know the motor car route to Joplin, Mo., also from Joplin to Palmyra, Mo.—E. A. Hildebrand.

Going north 44 miles to Winfield, Kan., through Newkirk, and Arkansas City turn east and follow through Independence, Coffeyville, Chetopa, Baxter Springs and Galena. For the best roads you had better head 181 miles to Kansas City via Peculiar, Harrisonville, Adrian, Butler, Rich Hill, Nevada, Lamar, Jasper and Carthage. Crossing Kansas the itinerary is Independence, Blue

Spring, Oak Grove, Odessa, Higginsville, Blackburn, Marshall, Slater, Glasgow, Armstrong, Yates, Higbee, Renick, Mexico, New London and Hannibal. Palmyra is then but a short distance northwest of Hannibal.

Chicago—New York.

BELVIDERE, Ill.—Editor Motor Age—I am contemplating a trip east about the middle of June and expect to start from Chicago going via Cleveland, Buffalo, Albany, Boston and New York. Can one find satisfactory road conditions through the hilly country adjacent to Pittsburgh to make it desirable to return by that route, probably going from Pittsburgh to Cleveland, or would it be preferable to make the return over the good roads of New York state to Buffalo and on home via Cleveland?

Is there any advance information as to road construction compelling one to detour from roads laid down in the Blue Book? In what editions of the Blue Book will detailed information be found? Do all the states through which I will pass recognize the Illinois license number and would one encounter any toll road officials anywhere on the trip?—F. T. Moran.

For your return trip if you go south to Philadelphia, then come west to Gettysburg, Bedford, and Greensburg to Pittsburgh you will have a very good road. The Pittsburgh-Cleveland road via Beaver Falls, Youngstown, and Ravenna is well traveled and no trouble should be experienced in good weather.

When roads under construction are encountered the detours are practically always marked, and if not directions can be secured close at hand.

Detail running directions are found in Blue Books, 4, 1 and 3 taken up consecutively. With the exception of Pennsylvania, which only grants the non-resident 10 days, the other states through which you will travel grant reciprocity to Illinois residents.

Dillsboro, Ind.—San Francisco

DILLSBORO, Ind.—Editor Motor Age—I would like some information on a trip to San Francisco this summer for a 30-horsepower car. About how long would it take to make the trip, and what is the best route?—L. H. Wolf.

In the issue of April 2 Motor Age had a lead story on transcontinental touring which will give you considerable information, such as you want. The central route is advisable and it will take you in the neighborhood of 2 weeks.

Parkersburg, W. Va.—Indianapolis

PARKERSBURG, W. Va.—Editor Motor Age—I would like the most direct road to Indianapolis over a good road, thence to Louis-

ville, Ky., Lexington, Huntington, W. Va., and back to Parkersburg. What Blue Book covers this route and where can it be procured?—H. H. Hall.

Route via Columbus, O., through Athens, Nelsonville, Lancaster, and Carroll, thence on the National highway to Indianapolis through Brighton, Springfield, Payton, Eaton, Richmond, Cambridge, and Greenfield. The Indianapolis-Louisville stretch is Franklin, Columbus, Seymour, Crothersville, Scottsburg and Memphis; to Lexington the towns are St. Matthews, Shelbyville, Frankfort, and Versailles; Lexington to Maysville is a very attractive routing through Paris, Millersburg, and Blue Lick Springs, then crossing into Ohio route along the river over quite a poor road with many bridges through Aberdeen, Manchester, Wrightsville, Rome, Rockville, Buena Vista, McGaw, Pond Run, Friendship to Portsmouth, also 28 miles to Ironton through Sciotoville and Wheelersburg, then to Huntington. Recross into Ohio and continue on this river road through Ironton, Chesapeake, Athalia, Gallipolis, Addison, Cheshire, Middleport, Pomeroy, Five Points, Chester, Tupper Plains, Coolville, Torch, Little Hocking and Belpre.

To avoid this poor road you could not take in Huntington. From Portsmouth you would have to go north to Circleville via Waverly, Chillicothe and Hopetown, east to Amanda and Lancaster, then south to Logan, Nelsonville, Athens, and Coolville.

The Blue Book 4 is sufficient for this trip, although it does not contain the directions from Maysville, Ky., to Portsmouth, Huntington and Parkersburg. It does give a routing from Maysville to Chillicothe, Circleville, Lancaster and Parkersburg, however. The books are published by the Automobile Blue Book Publishing Co., Chicago.

Routes to Indianapolis, Ind.

SEBRING, O.—Editor Motor Age—Kindly give me the best route to Indianapolis, as I wish to motor the races.—Reader.

Alliance to Canton is 18 miles; then you motor 154 miles to Lima over rolling country but good roads and good scenery through Massillon, Greenville, Wooster, Hayesville, Mansfield, Gallon, Bucyrus, Upper Sandusky, Forest and Ada. Lima to Indianapolis is 163 miles and the routing is Cridersville, Wapakoneta, St. Marys, Coldwater, Portland, Muncie, Anderson, Pendleton and Cumberland.

TAYLORVILLE, Ill.—Editor Motor Age—I would like the best route to Indianapolis, as I intend to drive through to the races.—C. A. Millegan.

Your itinerary leads through Assumption, Shelbyville, Windsor, Mattoon, Charleston, Grandview, Paris, Terre Haute, Brazil, Harmony, Coatsville, Belleville, Plainfield and Bridgeport.

Car Manufacturers Draft Code for Road Builders

Automobile Chamber of Commerce Offers Interesting Rules

NEW YORK, May 9.—Highway authorities may reconcile the demands of motorists and business men for permanent intercity highways and of farmers for improved tributary roads with the objection of taxpayers to increased road taxes by following these rules, formulated by the National Automobile Chamber of Commerce after a study of the opinions of prominent highway authorities:

Take a census of traffic to ascertain the number and kinds of vehicles using the state roads at different points.

Build brick, concrete or other durable roads wherever there is much heavy teaming, motor trucking and motor car driving.

Such roads should be built wherever the cost of properly maintaining any other kind would amount to more in 25 years than the cost of maintaining the durable roads plus its extra first cost and interest on the excess.

Issue 15-year to 25-year bonds to pay for permanent work if sufficient funds are not available. It is sound economic policy to raise money with bonds for all road work that will outlive the term of the bonds.

Pay out of current funds provided by general taxation and assessment the cost of surfacing with any material that is not as durable as brick or concrete.

Make gravel roads where traffic is comparatively light and there is not much motor car travel, first grading and draining the foundation thoroughly.

Extend the mileage of permanent highways with money saved by building gravel roads instead of macadam roads.

Confine construction as much as possible to durable roads and gravel roads so that the total cost will not exceed that of an equal mileage of macadam roads nor increase the state or county expenditure.

Use quartz, shells, burnt clay or a mixture of sand and clay where gravel is not readily obtainable. They are all good substitutes.

Grade and drain the earth roads and insist upon having them dragged in spring and fall. If necessary, get a drag law passed similar to those in Iowa and Ohio. Drag the gravel roads also in spring and fall and apply new gravel to ruts and depressions.

Concentrate the expenditure of state funds on the improvement and maintenance of intercity or trunk lines, because they carry about 80 per cent of the total traffic.

Instead of depending for road funds upon uncertain appropriations by legislature, provide by law for an annual levy on all taxable property.

Work convicts on the roads and in the production of road materials, thereby cutting down the labor cost.

Have the state or county acquire or lease gravel and sand pits and install modern excavating, sifting and washing machinery to reduce the cost of materials.

Select the most suitable materials nearest the roads to be improved, remembering that haulage is a large item of expense.

Call for bids on long stretches or big mileages or road in one locality to be built at one time, thus enabling contractors to use motor trucks or tractors for hauling and other special labor and time-saving machinery.

Test all materials before use and see that the contractors live up to specifications. Also make certain that the most successful methods are followed in building brick and concrete roads.

Adherence to these policies will be pretty sure to satisfy all road users and taxpayers and win approval for the highway commissioner who adopts them.

OLD TRAILS' BOOSTERS MEET

Indianapolis, Ind., May 11.—The third annual meeting of the National Old Trails Roads' Association was held here Thursday and Friday of last week. While there was a fair attendance, it fell below expectations, but there was no lack of enthusiasm. It was decided to hold the next convention at Grand Canyon, Ariz. Officers were elected as follows: President, Judge James M. Lowe, Kansas City, Mo.; vice-president, Rev. Harvey M. Shields,

Dawson, N. M.; secretary-treasurer, Frank A. Davis, Herrington, Kas.

A resolution was adopted asking President Wilson to set aside one day of the year as good roads' day and urging that on that day every citizen in the United States work for the improvement of highways and asking the states through which the Old Trails route passes to use their best efforts in the interest of the highway proposal.

Judge Lowe, in his annual address, urged that the United States government render aid in building a system of trunk highways rather than for smaller roads, which he said would result if the Shackleford bill in congress were passed. He said it would cost about \$400,000,000 a year to bring about such results as the Shackleford bill intended and said that part of the bill is absurd. He said 50,000 miles of national highways would serve 92 per cent of the total population. A resolution was adopted urging congress to appropriate funds to carry out the Old Trails plan.

NEW RULING ON LIGHT LAW

Sioux City, Ia., May 9.—The poor, down-trodden motorist has achieved one triumph in the state of Iowa by a new decision of the Iowa supreme court which nullifies the various city ordinances requiring cars to bear lights at night even though they are not in motion. Nearly every city in the state has been making arrests of owners who allow cars to stand at a curb after night unlighted. The court holds that this is not the intention of the law and that there is no more reason why a motor car, stationary, should bear lights than any other vehicle. It concedes that it might be wise for all to display danger signals but refuses to single out motor cars alone as a mark for any such ruling.

MASSACHUSETTS REGISTRATIONS

Boston, Mass., May 9.—With only 4 months of 1914 gone the registrations of motor cars in Massachusetts is now larger than for the whole 12 months of 1912 and the figures show that they are but 11,000 fewer than the entire year of 1913. This is a good indication of the prosperity of the motor industry. There has been an increase of approximately 17.6 per cent registrations for the first 4 months of this year over the corresponding period of a year ago. From January 1 to April 30 last year there were 43,544 motor cars listed, a gain of 7,682 over the same period in 1912. This year with 51,226 cars registered so far it shows an increase of 7,582 over 1913, so the relative gain for 2 years is about the same. The receipts have jumped also until now more money has

been received than for the entire year of 1912. It looks as if the \$1,000,000 mark will be reached this year. In 1913 the total receipts were \$764,153.51. Here are the comparative figures for the first quarter of 1913 and 1914:

	1913	1914	Increase
Motor cars.	43,544	51,226	7,582
Motorcycles	3,524	4,092	568
Mfrs. and dealers ..	1,196	1,371	175
Operators ..	4,453	4,678	225
Operators renewals	14,945	17,483	2,538
Chauffeurs ..	1,804	1,388	*416
Chauffeurs renewals	5,066	6,219	1,153
Receipts ..	\$522,850.50	\$621,053.99	\$98,203.40

*Decrease.

IOWA BUYING MANY CARS

Des Moines, Ia., May 11.—The state motor car registry department estimates that Iowans will own and register 45,000 more cars this year than in 1913. In the first 4 months of this year there were more cars registered than in the entire year last year. The total registration for this year already is over 70,000 and the total for all of 1913 was smaller than that. The total for the first 4 months of 1913 was only 39,000. This is only a little more than half the number already tagged this year. Basing their estimates on the experience of previous years, state officials predict a total of 115,000 cars registered before the end of the year.

GEORGIA LAW HELD VOID

Savannah, Ga., May 9.—Hundreds of owners in Savannah and Chatham county will be interested in an announcement made by Attorney-General Warren Grice that the motor tax act passed by the recent legislature, raising the tax on cars from \$2 to \$5, is void. This is the unofficial opinion of the attorney-general. He believes that the new law cannot be enforced. The opinion of the attorney-general is based on the claim that the act does not make itself clear in regard to county mileage, and that it is not the function of the court to interpret the meaning but to enforce the letter of the law.

Owners who have not paid the increased tax are safe. They can now wait for somebody to come along and try to enforce the law. Then if they desire they will have an opportunity to test the law out for themselves.

STOUT WITH SCRIPPS-BOOTH

Detroit, Mich., May 11.—William B. Stout, cyclecar expert of the staff of Motor Age, has been appointed chief engineer of the Scripps-Booth Cyclecar Co., of Detroit, Mich. Mr. Stout has been a leading exponent of the cyclecar movement since its inception. He takes up his new duties on May 15, severing his connections with Motor Age.



The Readers' Clearing House



METHOD OF TIMING A MOTOR

Instructions Given for Doing Work Properly—Flywheel Markings

NEW YORK—Editor Motor Age—Kindly give diagram and explain the meaning of the markings on the flywheel.

2—How is one to determine, for the purpose of valve timing, where the crankshaft is, say 15 degrees angle past top dead center and 20 degrees after bottom dead center, or 40 degrees before bottom dead center or 5 degrees after top dead center? How can one ascertain what constitutes a certain number of degrees?

3—Can this timing be regulated by the nuts on the valve tappets or must camshaft be re-set assuming valves are not properly timed?—G. S. Wittson.

1—The flywheel should have the timing of all the valves and the head centers of the pistons plainly marked. The mark may be an arrow head or punch mark, and a light scratch should run across the flywheel, with the meaning stamped beside and reading, for example, "1 and 4 INLET OPEN," "2 & 3 DEAD CENTER." The marks mean that when a pointer, usually placed in the center line of the motor, is pointing to that line that one of the valves designated is starting to open or close, or two of the pistons are at their dead center or highest point. Fig. 1 illustrates and should make this clear.

When testing the valves for the points of opening or closing it is sometimes difficult to determine the exact point at which the lifter is tight. A little clearance between the valve-stem and the lifter allows for expansion and the valve to seat tight. If the valve lifters are not spring-controlled the least rattle or shake can be readily detected with the finger, or if this method is not practicable a cigaret paper is the thinnest piece of material to be had, and this may be placed between the valve stem and the lifter. When it is tight the valve may be considered as starting to open.

2—When a car leaves the factory for delivery the motor timing gears and flywheel should be so marked that trouble will not follow if the gears are carelessly removed. Much of the trouble and dissatisfaction at repair and overhauling work is probably due to original valve timing by the mechanic who has been experimenting with gears that were not marked. There may be two, three, four or five gears in the timing case and all should be carefully marked, not with the nearest cold chisel or center punch, but with a set of figures or letters. The tooth of one gear and the space of the one that it is in mesh with it should be clearly marked with the same symbol and that symbol used only once.

If there are two gears of the same size in the case as the magneto and pump shaft gears, and placed at opposite sides of the case, stamp the gear and shaft also to prevent getting them mixed up. Careless-

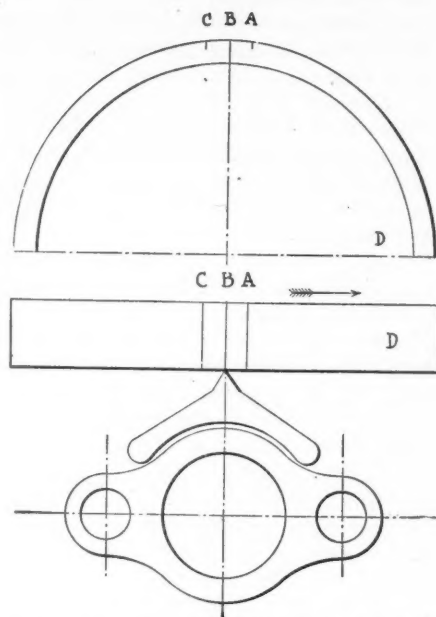


FIG. 1—METHOD OF USING INDICATOR TO TIME VALVES

There are usually three marks together. The first one A usually is top dead center, the next B is exhaust closed, and the third C is inlet opened. D is the flywheel as viewed from the front

ness there may result in the gears being meshed otherwise than the way they have been fitted, and they may run noisy. If a gear is held with two keys, 180 degrees apart, place symbol marks so that the gear can be readily replaced and the symbol marks coincide. Camshaft gears may be bolted to a flange on the shaft, and both the shaft flange and the gear should be marked so that the gear can be readily replaced correctly. Were the factory to mark the gears thus the multitude of scratches and marks often seen would not be needed, nor eccentric and original valve timing cause low-powered or over-heated engines.

Valve lifters should be set so that every valve stem has the same amount of clearance. One-thirty second to 1/64 inch is generally sufficient and more than this will make the motor noisy. A piece of steel or brass of this thickness may be readily obtained and placed between valve and lifter,

will allow adjustments to be made quickly and easily.

Unless the cams have been removed from the shaft it is safe to assume that with the proper opening of the inlet valve and proper closing of the exhaust valve the other points of operation for the valves are correct. If the exhaust valve closes either at top dead center or within 1½ inch after, and the inlet opens right after the exhaust closes or within a distance of not more than 2½ inches past the dead center mark, the valves may be assumed to be correctly timed. The measurements are made on the rim of the flywheel, and the above figures are large-size flywheels.

When considering the power output of a motor as low and due to defective valve timing, the flywheel is not marked, and the marks on the gears unreliable, the best thing to do is to make a diagram of where the valves are actually opening and closing. With a compass lay out a circle, of any convenient diameter to represent the rim of the flywheel, and draw the vertical diameter, which will represent the dead centers. With whatever means practical find out the time of the inlet valve opening.

Suppose it opens ¼ inch after the piston has passed the dead center and is traveling downward. If the stroke of the motor be considered as 5 inches this would be one-twentieth of the stroke, and measured in degrees $180 \div 20$, or 9 degrees. With a protractor lay off 9 degrees on the circle past the dead center point. Then take the point of inlet valve closing, and suppose it to be ½ inch after the lower dead center. This would represent 18 degrees, and lay this off on the circle in the same manner. Then treat the opening and closing of the exhaust valve in the same manner, and the result would be a diagram like Fig. 3.

Here the exhaust valve has been supposed to open 1 inch before the lower dead center and to close ½ inch past the upper dead center. A glance at the diagram will show that the motor is timed correctly according to the principles of valve timing. Were the gears meshed one tooth off it would affect the time about 3 or 4 inches on the flywheel rim. Either the exhaust valve would close before center, thus retaining a

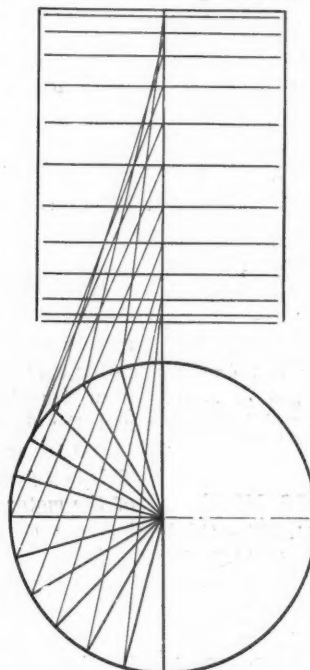


FIG. 2—RELATION OF PISTON TRAVEL TO CRANK ROTATION

This indicates the distance the piston travels for each 15 degrees the crank pin rotates

certain amount of the dead gas and weakening the mixture, or make the motor run much hotter, as it would be subject to the heat of the gas for longer time. The inlet would remain open so late that part of the gas drawn in would be pushed out through open port when the piston should be compressing the gas with the valves closed. Or, on the other hand, it would close too early, which would result in a scanty charge being drawn into the cylinders. In actual latter-day practice the inlet is held open a small amount of the compression stroke, so as to take advantage of the inertia of the inrushing gas, this being sufficient to overcome the slight compression effect produced for the initial 5 or 10 degrees of crank movement past the lower dead center.

3—This timing can be regulated by the nuts on the valve tappets. If the valves are not properly timed the camshaft must be reset. Slight misadjustments of the valves can be remedied by regulating the length of the valve tappets, but it has comparatively small effect on the actual valve timing.

BEST CRANKSHAFT SUPPORT.

Motor Design Will Determine Largely the Number of Bearings

Beemer, Neb.—Editor Motor Age—I have a 1913 model motor car having a block-cast four-cylinder motor $3\frac{1}{2}$ by 5 inches. The valves are timed to open as follows: From top dead center the inlet valve opens, and closes at bottom dead center or 180 degrees. The exhaust valve opens at bottom dead center on power stroke and closes at top dead center or 180 degrees apart. This is the only motor I know of which has valves timed this way and I have written to the manufacturers asking them why they time this way and to explain to me why it is that other manufacturers close the exhaust valve about 9 degrees past top center and inlet opens about 11 degrees past top center and close inlet about 30 degrees past bottom center and open exhaust about 50 degrees before bottom center, and the only reply I can get is that they have not time to discuss the pros and cons of motor construction.

2—Is not a five-bearing crankshaft considered better than a three-bearing and certainly better than one having only two in a four-cylinder motor?—G. Sharp.

1—The subject of valve timing is one which has been discussed by engineers frequently and it appears that although certain formulas are considered good they are not applicable to all types and sizes of engines. The engine you have, no doubt has been timed in many ways before the most efficient formula had been adopted and since the manufacturer's engineers have decided upon certain figures it appears reasonable to believe that you cannot improve upon them. You will find by studying the timing of the motors now on the market that there are many which show unusual timing and it should not be taken that such motors are improperly timed.

2—The five-bearing crankshaft is not necessarily better than either the three or two-bearing shaft in a four-cylinder motor. You will find that the four-cylinder five-bearing motor usually, if not always, has its cylinder cast separately, thus making a comparatively long shaft and motor. With a long shaft the points

of support must naturally be many to obtain rigidity and it would not do for a very long motor to have a two-bearing shaft, although some have three large supports. The motor design then plays a big part in the number of bearings to support the crankshaft. The small block motor with a two-bearing crankshaft shows excellent results and the intermediate block and pair-cast motors with three-bearing shafts are also showing up well. Taking the small block motor, any increase in the number of bearings adds to the frictional loss, to the cost and detracts from its simplicity. The bearings usually used in this type are made long to give good service. However, in two motors exactly the same in every respect but crankshaft support and one with

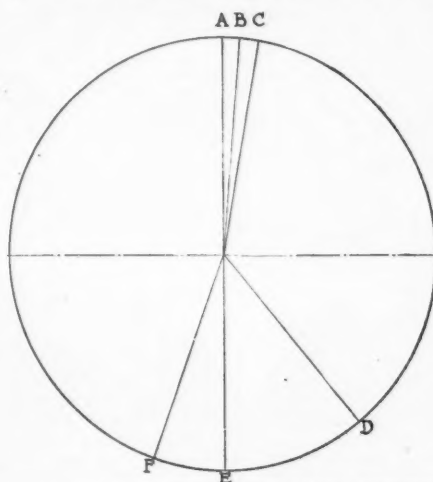


FIG. 3—PRINCIPLES OF VALVE OPENING AND CLOSING

In this case the flywheel is viewed from the rear. A is top dead center and E is bottom dead center, B is exhaust closed, C is inlet opened, D is exhaust opened and F is inlet closed.

two and the other with five-bearings, the latter will in most cases show longer life than the former.

WANTS TO MAKE CAR SPEEDIER Will Replace Old Carburetor with New One—Some Hints

Chapman, Kan.—Editor Motor Age—I would like to get some information regarding getting more power out of a motor. I am having carburetor trouble now, but will replace the carburetor with one of later make. The engine is in good condition, including the ignition system.

2—I noticed that one of your readers advises putting aluminum plates on the pistons. My motor seems to have low compression compared with other motors I have cranked. This is under normal conditions. What I want to know is, would a person get enough more power to pay putting on the plates? Would it lessen the speed any on account of the pistons being too heavy?

3—Does a motor run better with a high compression than with a low?

4—How much compression has the Overland motor model 26 with a bore of $4\frac{1}{4}$ and stroke of $4\frac{1}{2}$?

5—How much compression would it stand?—A Reader.

1—It is a difficult matter to increase the power of the motor without going to some trouble. A good method is to countersink the valve seats, making them larger, and then getting larger valves for both the intake and exhaust. Much depends upon carburetor adjustment and

ignition timing. Decreasing the size of the combustion space is given some consideration, but it is hardly worth while to attempt to redesign the engine. Your reason for increasing the power of the motor evidently is to get a faster car. This may be accomplished by leaving the motor alone and paying attention to weight and wind resistance, a thing which racing car designers consider first. It is not so much the power of the engine as it is the lines of the car and its weight. If you will give Motor Age the make and model of the car, perhaps more may be told. You may gain a little by reading how one owner got considerably more power from a Ford car. This article was published in Motor Age, issue of January 8, page 68.

2—Motor Age hardly believes it is good policy to attach aluminum plates to the pistons. A better method would be to get longer pistons of such material so that the pistons will not weigh more than the pistons now in use. The reciprocating parts of the motor should be as light as possible.

3—Motor Age is at a loss to understand what you mean by running better. Both high and low-compression motors run well. The former has a greater tendency to heat than the latter, but then this is taken care of in the design of the cooling system.

4—About 75 pounds per square inch, it is stated.

5—No test has been made as to how much this motor will stand and to get the exact figure one must experiment. It might stand 200 pounds' pressure, but the heat generated would be so great that the cooling system may not be able to take care of it. The motor of which you speak has been designed with an object in view that of giving the most satisfactory service for ordinary work. The life of the engine will be materially decreased if you attempt to change things from what they are.

Renewing Dry Cells

Wessington, S. D.—Editor Motor Age—Kindly give me a formula for making a liquid renewer for exhausted dry cell batteries. The formula to contain bisulphate of mercury and chloride of ammonia, with instructions for using.—D. C. Fylpa.

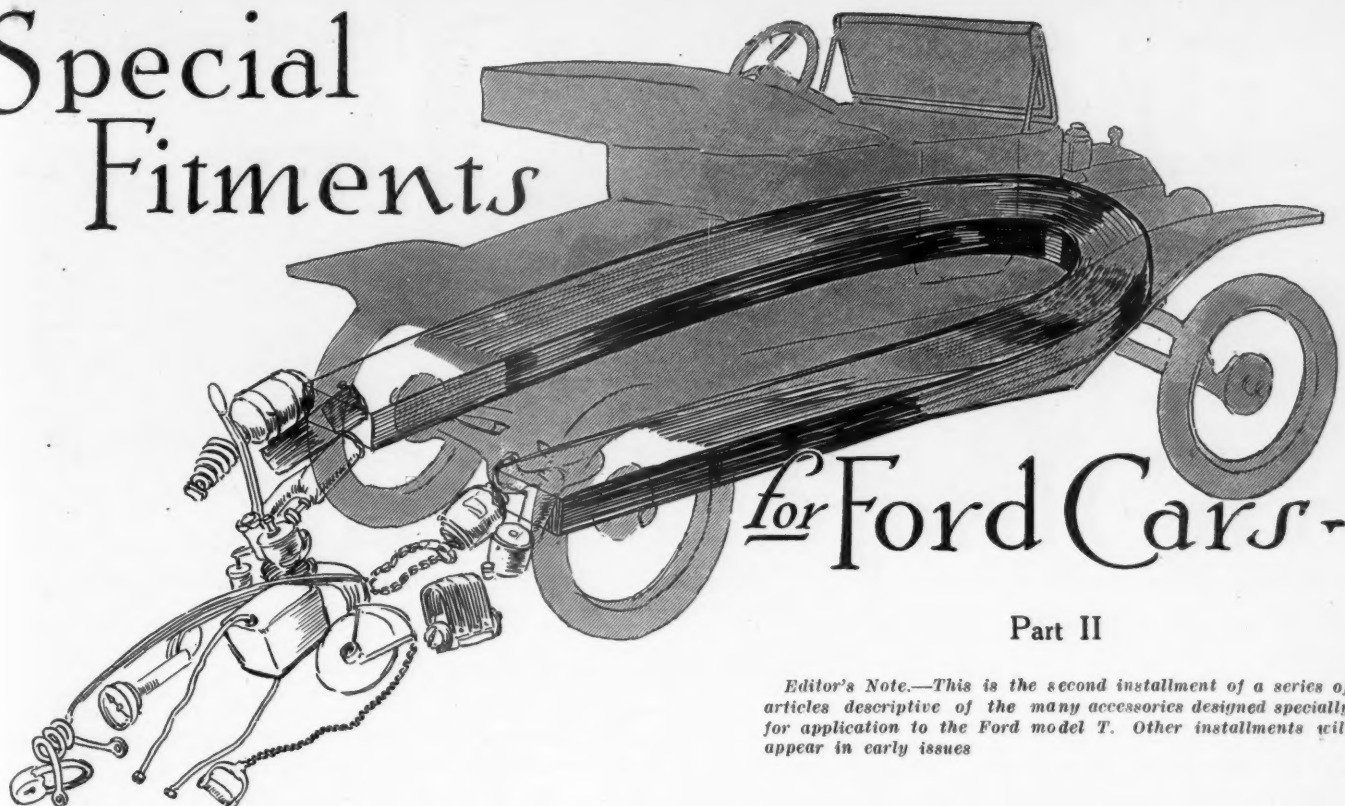
Motor Age knows of no formula using bicloride of ammonia and bisulphate of mercury as a dry cell reviver. These revivers help the cells little and it is cheaper and better to get new cells when the old ones are exhausted.

Questions Answered and Communications Received

G. S. Wittson.....New York
A Subscriber.....Taylor Falls, Minn.
G. Sharp.....Beemer, Neb.
A Reader.....Chapman, Kan.
D. C. Fylpa.....Wessington, N. D.

No communication not signed with the reader's full name and address will be answered.

Special Fitments



for Ford Cars.

Part II

Editor's Note.—This is the second installment of a series of articles descriptive of the many accessories designed specially for application to the Ford model T. Other installments will appear in early issues

FOR the benefit of owners of Ford cars, representative types of many of the specialties for the model T are illustrated and described in these pages. Manufacturers of these special accessories have found a profitable field among Ford owners, not because the car, as it leaves the factory, is not complete, but because most of us are not satisfied with necessities, but must have luxuries. Also a profitable percentage of new owners want something different from the stock equipment, if for no other reason, than to make the cars different from the other 500,000 Fords. Last week Motor Age described and illustrated the various lighting and starting methods, magnetos master vibrators, timers and other ignition specialties, designed particularly for the Ford.

Special Spark Plugs for Fords

THERE are certain features of the Ford engine construction which makes the use of a special design of spark plug advantageous. The thickness of the cylinder head requires that the shank of the plug be rather longer than usual for the sparking points to be in the best position and the plug easily removed.

A. R. Mosler & Co., Mt. Vernon, N. Y., recently has added to its line of Spitfire plugs a special plug with an extra long shank. The firing point has the characteristic Spitfire four-leaf clover design. A set of four is sold for \$3. The Spitfire priming plug of the breech-block type at 50 cents is a recent addition. The Apco Special of the Auto Parts Co. has an extremely long body, making its removal from the cylinder easy. It has an oil drip point which is said to prevent an oil short circuit, can be taken apart very easily for cleaning and sells for 50 cents. This firm also markets a priming plug which is the same as the one just described except that the priming cup is added. It lists at \$1.

Emil Grossman, New York, has a special design of Red Head plugs for Fords. These have the long shank in addition to the usual Red Head features. Also there is a Ford priming plug. The latter at \$1.25. The Sharp Spark Plug Co., Cleveland, O., manufactures a specially designed plug. This is of sturdy construction and has mica insulation. It sells for 50 cents. The K-W Ignition Co., Cleveland, O., has special Ford priming plugs at \$3 per set of four. The Frontier Specialty Co., Buffalo, N. Y., makes the All-in-One priming plugs for Fords. These sell at \$5 per set of four.

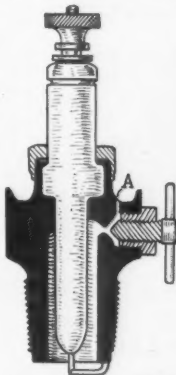
Special AC spark plugs are produced by the Champion Ignition Co., Flint, Mich. These

have an extraordinary length of insulation from the shoulder of the porcelain to the electrode. For this reason it is claimed to be free from short-circuiting due to excess of soot or oil. The Champion priming plug, with its ball check valve, sells for \$1.25. Metzger Soot-Proof plugs are made in a special size for Fords, as are the Bethlehem five-point plugs. Ordinary and priming plugs are marketed under the name of Gibson Quality by the Gibson Automobile Co., Indianapolis, Ind., at \$1 and \$1.50. The Jeffrey-Dewitt Co., Detroit, Mich.,

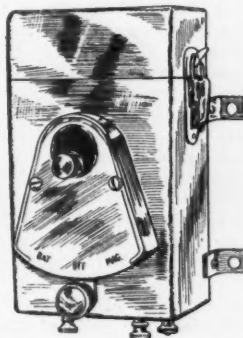
Also the fact that the engine is not fitted with priming cups leads many to use plugs with which the priming cup feature is incorporated. All of the special Ford plugs have one or both of these features just described. Below are illustrated two of them that have the priming feature.

makes special J-D conical open-end spark plugs whose feature is a long porcelain, eliminating chances of fouling or warping. They are listed at 75 cents.

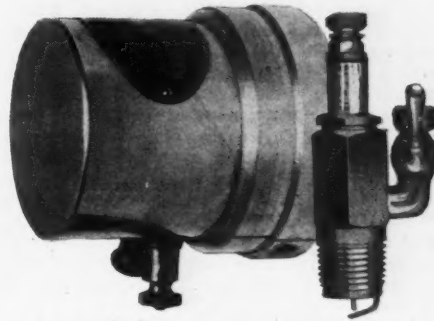
A new V-Ray Ford special plug has appeared which is designed to be wrench-proof. That is, the hexagon portion of the steel shell which takes the wrench is extended up and away from the motor's countersink so that the spring of the wrench can cause no damage to the plug. The older V-Ray features are retained. It is made in porcelain only and sells at \$1.



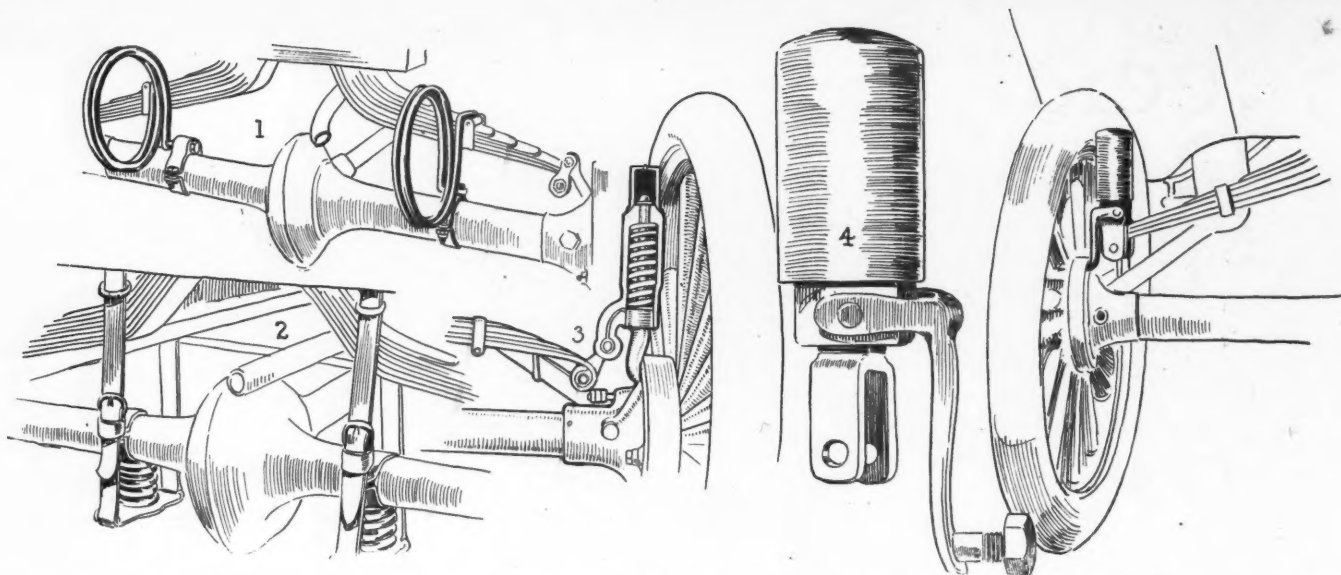
A MOSLER PRIMING PLUG



STANDARD TYPE OF MASTER VIBRATOR



AT LEFT, CROWE MASTER VIBRATOR; AT RIGHT, K-W PRIMING PLUG



FOUR DEVICES FOR LESSENING THE ROAD SHOCKS. 1, CUSHIONET; 2, MITCHELL REBOUND STRAPS; 3, K-W ROAD SMOOTHER; 4, ELY SHOCK ABSORBER

To Soften the Bumps and Jolts of Rough Roads

MOTOR AGE will not dispute the Ford company's claim for easy riding nor the statement of shock absorber makers that the car would ride much better with their devices in-

stalled but will give the features of the most prominent Ford shock absorbers. Most of these are of the coiled-spring type and are placed between end of spring and axle.

One of the most recent introductions by a large concern is the K-W road smoother, a product of the K-W Ignition Co. The smoother is in the form of a barrel and is placed at the end of the spring. The maker claims spring action is not interfered with. The K-W device may be installed easily in from 1 to 2 hours and sells for \$25 per set of four. All the prominent shock absorbers, such as the Hartford, Connecticut and J-M are made in types to fit the needs of the Ford.

Many auxiliary spring type of shock absorbers have appeared. The Cushionet is a product of the Walker-Moore Mfg. Co., Racine, Wis., and appears in the form of circular coil springs attached at one end to the springs and at the other to the axles as shown in an illustration herewith. A set of four sells for \$10. The Mesinger is a comparatively recent introduction and consists of two coil springs attached to the frame or floor of the car at one end and by a strap at the other, the strap looping around the axle housing. The rebound is checked by the resistance offered by the coil springs. The Mesinger absorbers are manufactured by the H. & F. Mesinger Mfg. Co., New York, and sell for \$4.50 per pair. A type which acts at the ends of the Ford springs and takes the place of the shackles is the Acme, made by the Acme Torsion Spring Co., Boston, Mass., and sells for \$12.50. The maker claims the Acme adds 18 feet to the spring-leaf area.

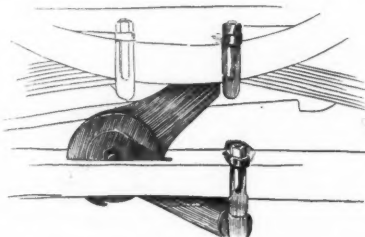
The Mitchell rebound check brought out by the Motor Specialties Co., Waltham, Mass., consists of two coil springs fastened underneath the axle and connected to the frame by straps. No tools other than a wrench are necessary in attaching Mitchell absorbers, which sell for \$12 per set of four. The Buckeye rebound device is almost a reverse Mitchell, and but three are required, one being placed in the front and two in the rear of the car. The Buckeye is made by the Central Brass and Fixture Co., Springfield, O., and sells for \$5 per set of three. The E. Z. Rider is a barrel type made by the Forest City Electric Co., Cleveland, O. Price, \$15 per set of four.

Springs which are of the shock-absorber type and which take the place of the regular Ford springs are marketed by the Franco Mfg. Co., Chicago, under the name of Resilio, and sell for

\$25 per set. These springs have a coil arrangement at their ends and the design is said to produce easy riding with a minimum of vibration transferred to the mechanism of the car.

The J. H. S. device, made by the J. H. Sager Co., is of the coil spring type interposed between the end of the spring and the axle. They sell at \$15 per pair.

One of the latest rebound devices for Ford cars which has come to the market is that known as the Road Maker and which replaces



CONNECTICUT SHOCK ABSORBER AS APPLIED TO FRONT OF FORD

the spring shackles supplied with the car. The Road Maker is of the barrel type and consists of a steel tube within which is a 3-inch helical spring, which is connected to the car spring by means of a piston. This shock absorber is made by S. W. Larham, Chicago.

A special shock absorber for Ford cars is the feature of the Velvet line, manufactured by the John Blackledge Co., Chicago. Its appearance is similar to that of larger Velvet models, and its construction is the same. Velvet shock absorbers are of the flat spring type, in which two helical springs are located in a flat telescopic case, there being one case on each side of the spring shackle. The price of the Ford type is \$22.50.

A shock absorber made by J. H. Hassler, Indian-

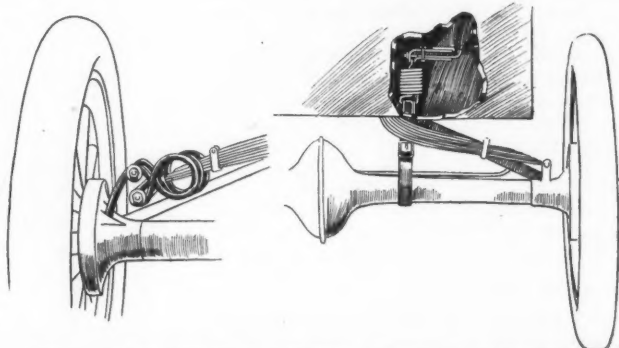
apolis, Ind., which, although of the spiral spring type, is quite original in its design. This consists of an arm that is pivoted on the end of the car spring, the shorter end of the arm being fastened to the axle and the longer end acts on a helical spring that is located on the axle. By thus multiplying the movement a softer spring can be used, and for this reason the spring is made of very flat, soft steel stock.

The Thomas Auxillary Spring Co. has brought out the rear suspension for Ford cars. The spring supplied with Ford cars is removed and in its place is used the one shown, which, as will be seen, has incorporated two auxillary coil springs. It is claimed that the location and material of the device makes riding easier. No special fittings are used with these springs, the clips and nuts supplied with the car being used.

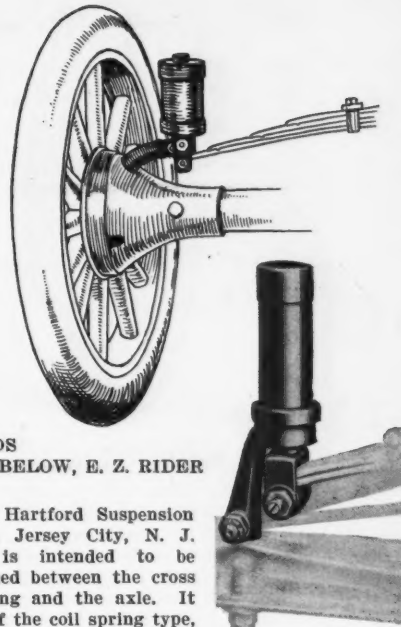
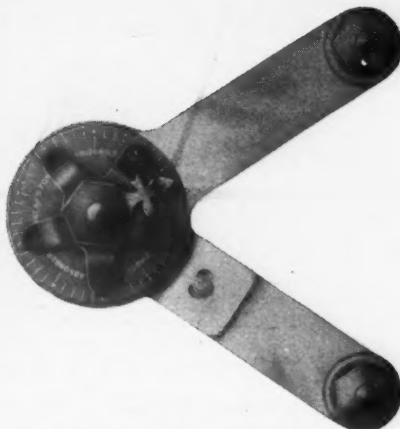
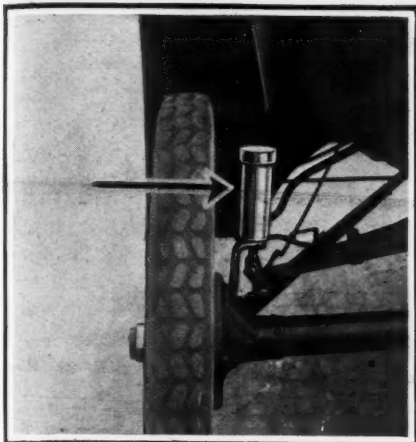
Frank Keegan, New York, has a supplementary spiral spring which is designed to be applied to Ford cars. The device is of simple construction and does not need oiling or other attention.

The Connecticut Shock Absorber Co., Meriden, Conn., has brought out a style of its Connecticut friction-type absorbers, specially designed for Fords. These have the same quality that distinguishes its larger ones and they are sold at \$22.50 per set.

The Auto Machine Co., Canisteo, N. Y., introduces a special Ford absorber of the vertical coil type. It is fitted with clamps to the axles



LEFT—ACME TORSION SPRING; RIGHT—MESINGER REBOUND CHECK



THREE TYPES OF SHOCK ABSORBERS FOR FORDS

LEFT—BUCHANAN ROADMAKER; CENTER—HARTFORD SCISSORS TYPE; RIGHT—JOHNSON; BELOW, E. Z. RIDER

and the top arms are attached by an eye-bolt, which is substituted for the regular fender bolt. It is a very simple and inexpensive device.

A rebound strap designed to prevent spring breakage, side sway and bouncing on bad roads is made by the L. H. Gilmore Co., Philadelphia, Pa. They can be attached without drilling and cost \$1 each. The Schaefer Sales Corp., Detroit, supplies the Dann oil spring inserts cut to special lengths for Fords ready for immediate installation between the spring leaves.

The latest of the coil-spring type inclosed in grease, is the Fordezer marketed by the Fulton-McCutchan Co., Chicago, at \$15 per set of four.

Another shock absorber of the spiral spring type is the F. F. manufactured by the France Mfg. Co., Cleveland, O. The F. F. consists of

a large-diameter spiral spring supported rigidly at the ends of the main springs of the Ford car, fitting in the places where the spring perches come off. The spiral springs are coupled to the main leaf springs by means of the regular hangers. These sell for \$25 per set of four.

The Triple Action Spring Co., Chicago, has a special shock absorber of the coil-spring type for Ford cars. It is intended to be attached between the spring hanger and the end of the spring and has two intercolled spiral springs, one to take the heavy shock and the other the lighter ones. They are incased in a water and dustproof cylinder and have the feature of being adjustable by a nut at the bottom through a range of 1,000 pounds. The cost is \$22.50 for a set of two.

The Hartford cushion spring is made by

the Hartford Suspension Co., Jersey City, N. J. It is intended to be placed between the cross spring and the axle. It is of the coil spring type, incased, and lists at \$20 per pair.

The Dann insert is a thin perforated strip of metal designed to go between the spring leaves from tip to tip. The perforations in the insert are filled with a heavy lubricant which is held permanently in place when the leaves are drawn together. This is intended to prevent squeaking, rusting and spring breaking. These are marketed by the Schaefer Sales Corp., Detroit, Mich. These are the inserts made by the Dann Oil Cushion Spring Insert Co., Chicago.

Special Ford Bumpers and Cutouts

USE of a muffler cutout has its advantages in the minds of many drivers who believe that adjustment of valves, carburetion and ignition can be carried on more readily when the sound of the explosions is distinct, and often an appreciable increase in power is noticeable. Among the special Ford muffler cutouts is the XL, made by the Auto Improvements Co., Bristol, R. I. This sells for \$3 and has the feature that a tongue is pro-

jected into the pipe when the muffler is opened, so that all the gas passes out through the cutout.

The Auto Parts Co. sells one which clamps around the pipe, a hole being cut in the latter. The price is \$1.50 complete with cable lock-open pedal, etc. The Lincoln Machine Shop, Lincoln, Ill., lists a similar one at \$1.35. Gray-Hawley cutout outfits may be obtained at \$2.25, and the Garage Equipment Mfg. Co.

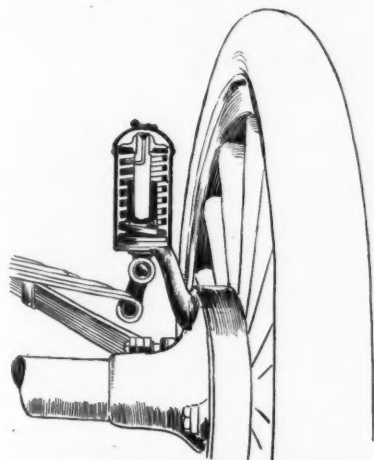
outfit, with locking pedal, at \$1.75 each.

Special bumpers for Fords are numerous. The Emil Grossman Co. has two types, one bolted on and the other clamped on. They are listed at from \$5.50 to \$8, depending on the finish. The Excelsior General Supplies Co., Chicago, has similar ones up to \$10.00, and the American Auto Supply Co. lists them at from \$3 to \$5. The L. P. Halladay Co., Streator, Ill., has three types selling at \$8 and \$10.

Exhaust Signals and Chimes for Fords

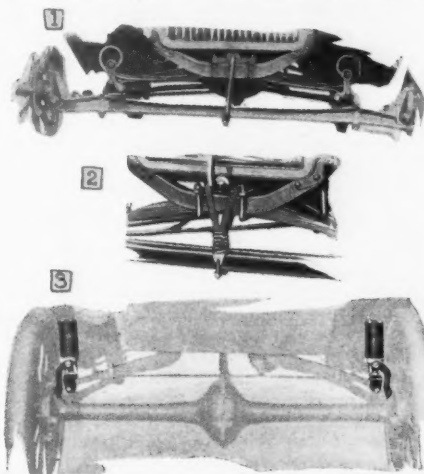
WARNING signals specially designed for application to this car are of three types: electric, exhaust and hand-operated. Some particularly ingenious electric horns on the market oper-

ate from the flywheel magneto so that it is not necessary to carry batteries. Others produce a sound similar to that of the electric horn by operating a ratchet and diaphragm by hand.



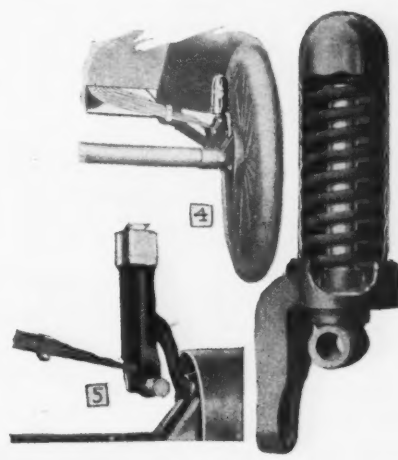
F-F SHOCK ABSORBER

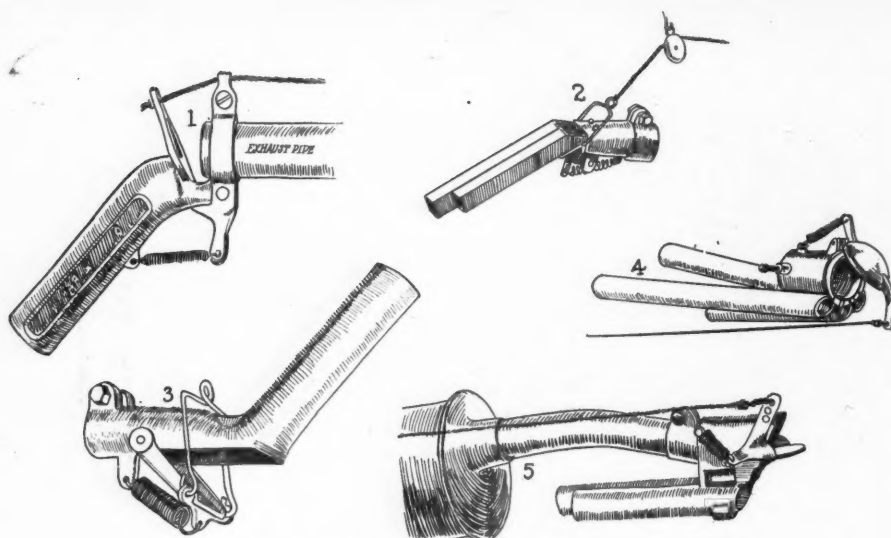
Sectional view shows arrangement of springs and the oiler



INTENDED TO INCREASE COMFORT ON ROUGH ROADS

1—Resilio springs; 2—Buckeye rebound straps; 3—J. M. Ford shock absorber; 4—Halladay applied and in section; 5—J. H. S. coil spring type





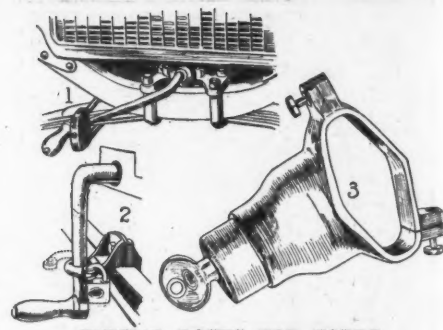
SPECIAL EXHAUST HORNS FOR FORDS

1—Auto Parts Co.; 2—Ahco exhaust whistle; 3—Jericho horn; 4—Minerva special chime; 5—Blazer signal

Most of the exhaust horns offered are operated by pedal and cable, which in nearly every case is given as equipment at the stated price. The Arnold-Hough Co., Providence, R. I., is marketing both single tone and chime whistles operated from the exhaust, under the name of Ahco. The single-tone type sells for \$2.50 and the chime for \$5. Among the other makers of horns for Ford cars may be mentioned the Minerva Hardware Co., which

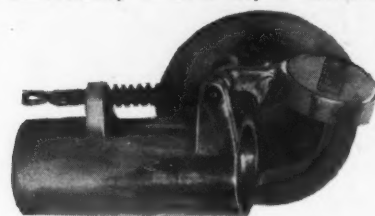
markets the Minerva Ford special at \$5 each.

The Auto Parts Co. also has an exhaust whistle designed specially for Fords. Ready to attach, with pedal cable and screws, it sells at \$3.50. A combination muffler cutout and Fogg horn having two chimes is another offering at \$5.50. The Motor Car Equipment Co., New York, markets an exhaust horn known as the Power. It retails with cable, pedal, etc., at \$3.50. The Fulton Co., Milwaukee, Wis.,



SPECIAL LOCKS FOR FORDS

1—Cochran; 2—B. & W.; 3—Norisko



TREMO EXHAUST HORN

makes a special type of its Aermore horn for Fords, which can be attached either in front of or behind the muffler. This sells for \$5.50. The Tremo exhaust horn, which is attached to the end of the muffler, is a simple type, which may be applied by anyone with a hammer and a screwdriver. It is made by the D. Henry Bonner Co., Cambridge, Mass., and sells for \$4. The Purdy exhaust horn for Fords is made by Purdy Bros Co., Chicago.

Wire Wheels and Demountable and Q. D. Rims

SPEEDY appearance and reputed easier riding and the saving qualities of the wire wheel together with the ease in tire changing where they are made demountable has created a mar-

ket among Ford owners for the metallic-spoked wheel. A number of special wire wheels have been brought out for this market. Q. D. and demountable rims for wood wheels are offered also.

The Houk Mfg. Co., Buffalo, N. Y., is putting out a special Houk detachable wire wheel for Fords of the same design as its standard line of wheels. The wheels are interchangeable, that is, the hub shells of all the wheels are alike so that any wheel may be placed on any one of the four hubs. The F. & H. Wire Wheel Co., of Columbus, O., has a similar outfit consisting of five wheels with either clincher or straight-side rims.

The Racine Auto Parts Co., Racine, Wis., supplies a set of four wheels fitted with clincher rims and substitution hubs designed to fit over the wooden hub. The set costs \$30. They are readily demountable and can be interchanged easily. A spare wire wheel, it is stated, can be attached in less time than it takes to replace a tire.

A detachable and interchangeable wire wheel for Fords has recently been brought out by the Cameron Wire Wheel Co., Detroit. These are copper plated and given two coats of black enamel, baked on, which insures them against rust. They are furnished in sets of five wheels so that the spare can be carried with the tire inflated and changed on the road when required. The tire size is 30 by 3½ all around, which gives the advantage of the same tire size front and rear. These wheels replace the wooden wheels on the present Ford hubs, leaving the brake drums and speedometer sprocket the same as on the wooden wheel.

Another is the wire wheel manufactured by the Standard Welding Co., Cleveland, O. These are arranged to be installed in place of the wooden wheels without need for machine work, every part necessary for attachment being provided. One of the features of the wheel is its low price, which is \$25 for a set of four.

Brandenburg Bros., Chicago, are marketing a new wire wheel interchangeable with the

wooden wheels of the Ford car. They are called the Linsay patent universal wheel and are listed at \$40 per set. They are made by the Great Western Mfg. Co., La Porte, Ind. Special wire wheels for Fords are produced by the Mott Wheel Works, Utica, N. Y. A complete set sells at \$20.

Universal wire wheels are distributed by the Detroit Universal Wire Wheel Co., Detroit, Mich. They are interchangeable and may be obtained in the regular Ford type sizes or in 30 by 3½ inch all around. Also 32 by 3 inch and 3½-inch wheels may be obtained. There are five wheels in a set.

Wire Wheel Case

Most of the wire wheels in use at present are designed so that the whole wheel is changed when a tire repair is made. The ordinary type of tire cover is unsuited for the spare tires carried because the spokes interfere with the cover's attachment. This led the Allen Auto Specialty Co., New York, to design a tire cover for demountable wheels.

Demountable Wood Wheels and Rims

A tire change in 2 minutes is said to be no uncommon feat with the use of Angier's spare demountable Ford wheel, brought out recently by F. L. Angier, Streator, Ill. The use of the Ford demountable enables one to carry a spare wheel with tire attached so that in the event of a blowout or puncture the entire wheel may be changed. The spare wheel is interchangeable with any of the ordinary Ford wheels. The use of the spare requires the installation of studs which replace the present hub bolts, new wheel flanges and a few minor attachments. The operation of preparing the car for this demountable feature is said to be the work of one man for 3 hours. With the

wheels installed under the Angier system the unscrewing of six nuts frees the wheel. The entire outfit ready for installation sells for \$20.

Baker demountable rims for Fords are offered by the American Auto Supply Co., New York. The rims are installed on the four wheels for \$45.

The well-known Baker demountable rims may be obtained in a special type for the Ford car from the Universal Rim Co., Chicago.

Demountable rims for Fords, which permit the release of the tire by the unlocking of one nut, are the Howard rims made by the Howard Demountable Rim Co., Trenton, N. J. The outfit already for attachment to the car consists of a set of Swartz wheels, a set of demountable rims with one point of adjustment, and five Q. D. tire rims. The set costs \$50.

Q. D. Rims

A quick detachable rim for Ford cars which is simple in construction and which may be fitted upon the old wheels is announced by the E-Z Rim Co., Boston, Mass. It appears that the simplicity of the E-Z rim is its main feature, for all that is necessary to remove the tire is to unscrew six nuts, thus releasing the ring and making the tire bead free. The maker states any garage can attach the rims in a short time. A set of four, using the old Ford wheels, sells for \$15.

A quick detachable rim is offered by the Motor Car Equipment Co., New York, which requires no tools for operation and which will carry either clincher or straight-side tires. The lugs with the teethlike parts may swing outward. Thus to remove the rim these lugs are pressed downward with the fingers, then moved outward slightly and the holding ring removed. Then, off comes the tire. The rims



AUTOLOCK IGNITION LOCK

on wheels cost \$50 per set, with a liberal allowance for the old wheels.

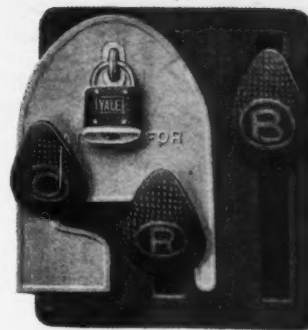
The Chester demountable rim for Fords is unique in that it can be applied to the present wheel, requiring no alteration of the latter, eliminating the cutting down of spokes and building up of felloes usually necessary. It is stated that it is not necessary even to take the wheel off the car. The rim can be demounted by the loosening of five nuts. There is an air space between rim and felloe, which, it is claimed, adds resiliency. The rim takes 32 by 3-inch tires all around instead of the 30 by 3

front and 30 by 3½ rear. The car owner, it is stated, can install the rims in 20 minutes. These are manufactured and distributed by the Chester Demountable Rim Co., Fall River.

The Funk Q. D. demountable rim is made by the Mott Wheel Works, Utica, N. Y., in a special size for Fords. The rim is held on the wheel by five bolts, loosening three of which permits a change. The rim is exceptionally light, it is said, and for mounting tires, the rim collapses from 6 to 8 inches. A simple tool is furnished by which the rim may be collapsed and automatically locked in open position. The set sells at \$13, including one spare.

Schwarz Wheel Co., Philadelphia, Pa., manufacturer of the Schwarz wheels with the interlocking spoke construction, is bringing out wheels fitted with Stanweld demountable rims for Ford cars.

The wheels are Schwarz design and construction, built with a dovetailed interlocking spoke, which insures rigidity and indestructibility in the center assembly. The wheels are carefully selected hickory, bored to the exact size of the hub barrel, and with the flange bolt holes drilled, so that it is possible to take off the hubs from the old wheels, and put them into the new in ½ hour, this being done by anyone. The wheels are fitted with Stanweld demountable rims and fittings, including an



FORD PEDAL LOCK

extra rim. Each set consists of four wheels and five rims, the set selling at \$25 in one coat of lead, or \$30 painted and ready for application.

Mutual Motor Service, Indianapolis, Ind., makes guaranteed, wrapped-tread tires in Ford sizes only. The company specializes in the Ford tires, on the principle that "one hat will fit only one head." The tires are said to be 25 per cent heavier than the usual tire of this size, and the specialization permits the price to be low.

Preventing Theft and Joy Riding

ONE sometimes hears it said in jest that the Ford owner is in no danger of having his car stolen but some owners have found to their sorrow that that statement is base slander. When a Ford is stolen the apprehension of the thief and the recovery of the car is rendered particularly difficult because there are so

many just alike on the streets. Whether he believes or not in the calumny as to the desirability of the Ford from the point of view of the light-fingered gentry, the wise owner will take precautions that he be not the one to suffer from theft. A number of safety devices of this sort have been produced for Fords.

One of these is a special model of the No Risko steering gear lock made by the C. J. Rogers Mfg. Co., Philadelphia, Pa. This is a clamp with a Corbin lock and key so arranged that a touch of the thumb locks the steering gear with the wheels turned at an angle. The crook that attempts to run away with a Ford thus equipped will find himself running around in circles. It costs \$6.

A lock, which secures the pedals of a Ford car and leaves the brakes free, is being marketed by the Ford Lock Co., Los Angeles, Cal. This lock is in the form of a steel plate, which is cut to fit around the clutch and reverse pedals and a Yale padlock, which holds the plate in position. The lock sells for \$1.

The K-W Ignition Co., Cleveland, O., has

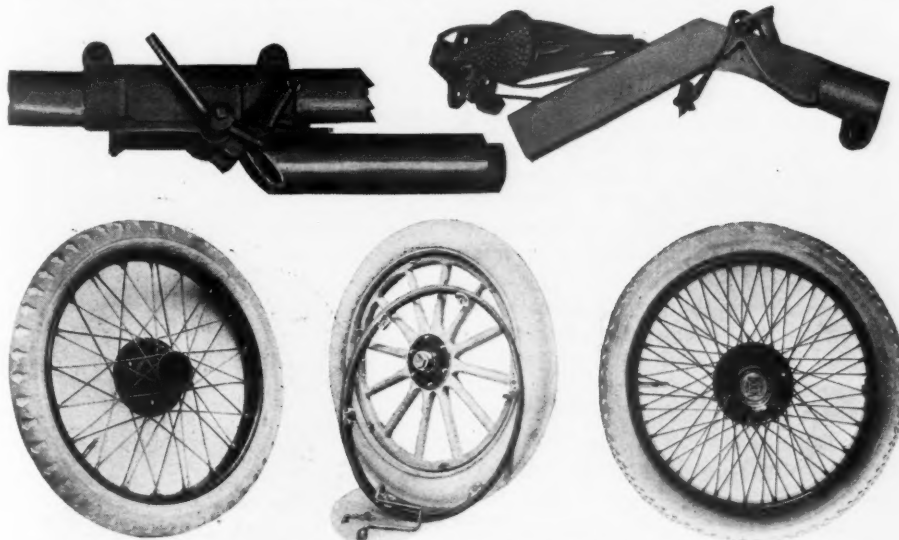
added a combination lock and ignition switch for Ford cars to its line of accessories, the newcomer being equipped with a Yale lock and utilizes the key for a plug. The key, when inserted and turned to either battery or magneto side, makes the motor operative, but when removed while in the off position the ignition system is locked and the motor cannot be started.

A combination crank lock and license carrier is made by H. C. Fairchild, Maplewood, N. J. It is attached to the front frame of the car by spring clips. The spring bolt acts as a carrier for the lock. Price, \$3. The Stop-Thief lock, which makes it impossible to start the Ford motor, is sold at \$1.50 by Marshall, Walter & Co., Milwaukee, Wis.

A very simple lock is the Bridges, made by the Cochran Pipe Wrench Mfg. Co., Chicago. It consists of a padlock with a very long shank. In operation the starting crank is pressed back into engagement with the engine shaft and the padlock passed around it and the car spring. It sells for \$1. One which serves a similar purpose, but is more elaborate, is the B. & W. lock, made by the Universal Mfg. Co., Racine, Wis. This works in the same way except that the crank is locked to a special plate on the axle. Price, \$1.50. The Gemco Ford lock

comprises a Yale lock which is attached over the magneto terminal. Pushing it down and locking it short-circuits the ignition, preventing starting of the engine. The lock is being placed on the market by the Garage Equipment Co., Milwaukee, Wis.

(To be continued.)



TYPES OF EXHAUST HORNS AND WIRE WHEELS

At the upper left, the Fogg Horn; at the upper right, the Power horn; below, from left to right, Cameron wire wheel, E. Z. rim, Hawk wire wheel and at the extreme right, the Chester demountable rim above, and the Funk rim below.



The Accessory Corner

Sectional Steel Garage

THE Sectional Steel Garage Co., Detroit, Mich., has on the market a portable garage which is 10 by 16 feet in size and which is built entirely of steel. The framework is of angle iron construction $1\frac{1}{4}$ by $1\frac{1}{4}$ by $\frac{1}{8}$ inch, with holes drilled for the bolting of the sections. The side sections are 24 inches wide and 8 feet high, there being seven of these on either side. The corners have a covering width of 12 inches each way, and are constructed in such a manner as to be the strongest and most substantial part of the entire structure. The roof trusses are made of the same angle iron size as the framework and are riveted together with one vertical center brace and two transverse stress braces also riveted together.

The garage is provided with two large swinging doors, which are 4 feet wide and 8 feet high. The siding used is 26-gauge galvanized and beaded sheet metal, braced with angles. Over the roof framework are laid galvanized corrugated sheets of 26 gauge with $\frac{5}{8}$ -inch corrugations. There are two windows 18 by 24 inches.

The garage shown in Fig. 1 weighs, complete, about 1,500 pounds, and is furnished with blue prints and instruction sheets ready to set up. All parts are marked to correspond with the blue print, which is a feature aiding quick erection. The garage is amply large for any touring car.

Bell Tire Pump

The Bell Pump Co., Detroit, Mich., has placed upon the market a type of tire pump with a plunger and connection to the tire valve which are of new construction, and prevent valve leakage.

In general appearance this Bell pump is not unlike the conventional hand pump, but examination of the plunger reveals its ingenious construction. The pump is shown in Fig. 2, at A, while the details of the plunger are made clear at B. Referring to the latter, it will be noticed that the threaded plunger rod P carries the plunger leather L, which is held tightly by a nut and between two heavy washers. Underneath the plunger leather a bevel-edged

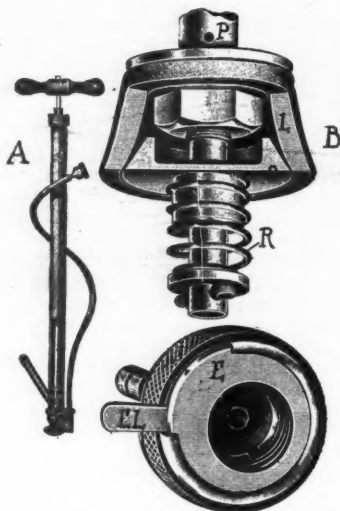


Fig. 2—Bell tire pump and plunger mechanism which is of unusual construction

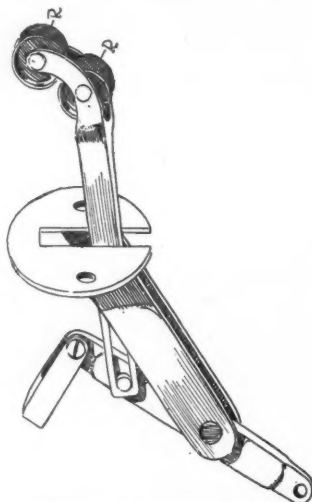


Fig. 3—Roller bearing accelerator pedal which makes throttle control easy

brass spreader disk, S, is sleeved upon the plunger rod and held up against the plunger leather at all times by a strong steel spring, R, which in turn is held in place by a washer on the rod end.

When the plunger is forced down the back pressure of the air in the pump forces the spreader disk up strongly against the leather and thus holds the latter closely to the walls of the pump barrel, preventing air escape by the plunger. On the up-stroke the steel spring maintains the close contact of the leather with the inside of the pump barrel and also permits no air escape past the plunger, it is claimed.

A ball check valve at the base of the pump prevents back pressure into the pump. The plunger rod is $\frac{3}{8}$ -inch steel, while the barrel is a heavy gauge brass and has a solid foot casting.

The Bell hose clamp for attachment to the tire valve is also shown. Unlike most hose connections which have rubber sockets

or depend upon the air pressure to hold them in place, this employs a threaded internal eccentric, E, in addition to the rubber socket. This eccentric operates internally upon the threaded part of the tire valve tube. Having placed the rubber socket on the valve tube in the usual way the eccentric lever EL is pushed over, when the threaded eccentric inside the clamp engages the external threads of the valve tube in the same manner as a nut would, making a positive connection, which cannot be removed until the eccentric lever is again thrown back to release it, it is claimed.

Biggs Retreading Vulcanizer

The Biggs Boiler Works, Akron, O., is marketing an all-steel retreading vulcanizer, shown in Fig. 4. The kettle is 4 feet in diameter and 40 inches long, having a capacity of from six to eight 42-inch casings. The shell and rear head are made of open hearth steel, it is claimed, and all riveting done under high pressure to insure stability. The Biggs sells for \$150.

Anderson Spring Wheel

A spring wheel which comprises a flexible tread covered with a solid rubber casing is announced by Lycurgus Anderson, Lake Creek, Tex. The tread consists of a series of metal blocks coupled by means of pins, so as to form an endless chain. The blocks have recesses for housing roller bearings. Resting upon each block is a spring-backed plunger operating in a cylinder. The action when in use is one of spring compression, causing piston movement so that the shock is absorbed partially by the spring and partially by the cushioning of the piston against the air in the cylinder. The wheel, shown in Fig. 5, is made of steel stampings and weighs no more than the ordinary wheel, it is claimed.

Hammer Lock Cotter Pins

The insertion, locking and removal of cotter very often requires much time, especially if the pin is to be placed or removed in an inaccessible part of the car.



Fig. 1—Sectional garage built entirely of steel and which weighs about 1,500 pounds complete

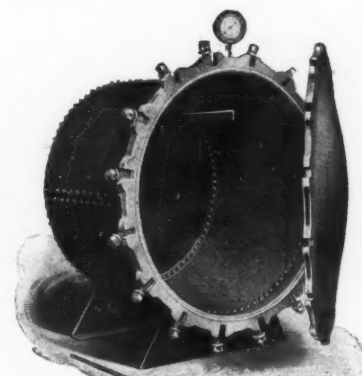


Fig. 4—Biggs retreading vulcanizer which has a capacity of from 6 to 8 42-inch casings

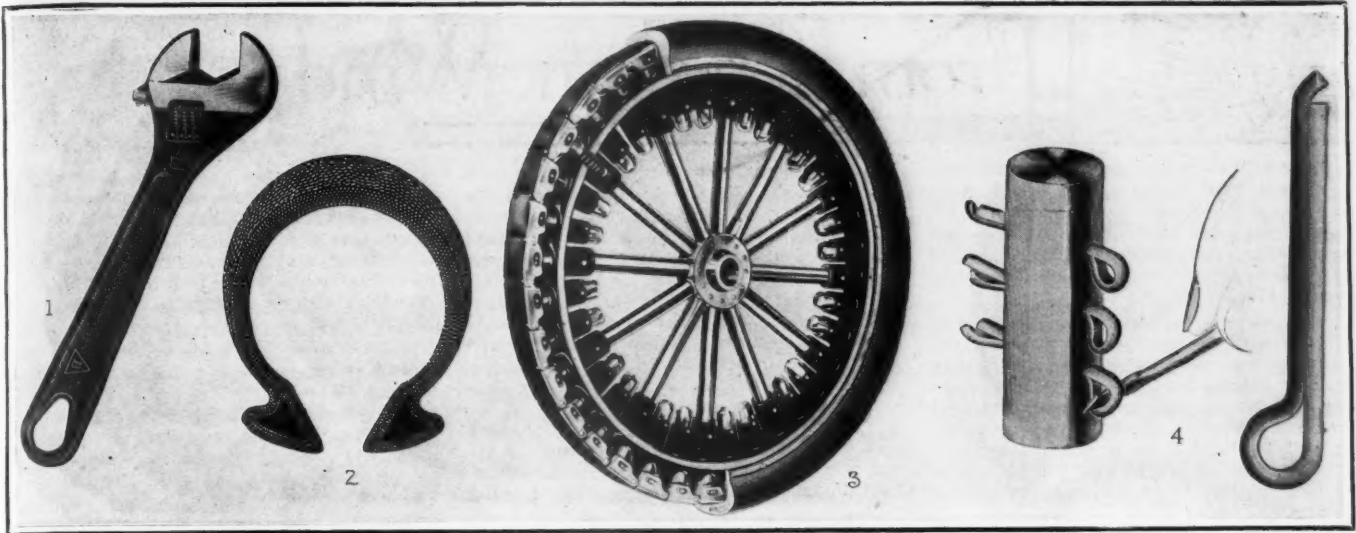


FIG. 5—NEW ACCESSORIES OF VALUE TO THE CAR OWNER

1—New B & S engineer's wrench which has thin jaws; 2—How an old tire looks which has been reconstructed by the Motor Reconstruction Co.; 3—Anderson spring wheel, a Texas product which has a flexible tread; 4—Hammer Lock cotter pin showing how it looks when inserted, when locked and about to be removed

Cotter pin trouble has been eliminated to a great extent by the Campbell Hammer Lock cotter pin, which is marketed by the American Chain Co., Bridgeport, Conn. This pin has one short and one long branch, as shown in Fig. 5, and as the points are always close together and tapered, it is an easy matter to insert the pin into a hole. A feature of this pin is that it locks itself automatically if the head is tapped slightly with a hammer. The striking, flattens the head and the shorter, or straight branch, rides over the branch upset at the end. The result is a well-locked pin. The prices range for from \$3.50 per 1,000 for the $\frac{3}{8}$ by $\frac{1}{16}$ size to \$144 per 1,000 for the $\frac{3}{4}$ by 4-inch.

New B. & S. Wrench

A new wrench has been brought out by the Billings & Spencer Co., Hartford, Conn., and is known as the engineers' wrench. The new B. & S. shown in Fig. 5 can be used wherever a solid end wrench is used and the thin jaws and adjustable feature make it particularly suitable for motor car use. It is made of drop-forged steel.

Dunkley Garage Outfit

There is perhaps nothing more useful around the garage than a compressed air outfit, and the apparatus manufactured by the Dunkley Co., Kalamazoo, Mich., is particularly valuable in that it not only provides air for tire inflation, but is supplied with vacuum cleaning attachment and a cleaner gun for getting at dirt.

The Dunkley outfit consists of a double-acting compressor, a vacuum tank and dust collector and an 80-gallon air tank, all of which are mounted on the same base. The compressor is mounted between the air tank and vacuum tank and pipe connections run from each. A suction by-pass in the piping to the vacuum tank and a pressure by-pass in the line to the air tank, make it possible to use either at will. The compressor is designed to be

driven by either external power through belt pulley connection, or by an electric motor geared to it. This compressor is water-cooled and can give any pressure up to 250 pounds.

In connection with the air tank there is a place for the attachment of a tube for tire inflation, while another outlet takes care of the air going to the cleaner gun. The latter has two hose connections, one from the tank and the other from a gasoline reservoir, suspended above the air tank and also a part of the outfit. To operate the gun, the gasoline valve is first turned on letting the right quantity flow, after which the air is turned on, atomizing the gasoline and forming a powerful cleansing blast which is said to literally cut and eat the oil, grease and dirt off the parts to be cleaned. The floor space required for the outfit is 7 by 2 feet.

Reconstructing Old Tires

Under the name of the Motor Tire Reconstruction Co., a concern has been started in New York city to carry on a line of work which consists in the re-making of worn out casings, or in other words of going beyond the mere re-treading of a shoe in giving it the appearance and for all practical purposes, the same construction as a new tire. The particular process which is used by the Motor Tire Re-Construction Co. is now in successful operation in Great Britain, all of the territory being in that country being now apportioned to agents.

The process of re-treading, in general consists of removing all the old tire down past the breaker strip to the old fabric carcass. The tire is then covered with not only a new tread but a new built-up band tapering in thickness from the tread down to the bead and giving the tire a section such as that shown in Fig. 5 at 2. The band or ring which is put over the old carcass has six or seven lay-

ers of a fabric made from fish line. This forms the joining material for a preparation consisting of Pasava gum and rubber. The whole mass is vulcanized together under 80 tons hydraulic pressure.

The secret of the process lies in the successful combination of the Pasava gum and the rubber. The difficulty in combining these two products is that the Pasava gum which is extracted by squeezing the Pasava nut, is a hydrocarbon which is a strong rubber solvent.

Before the heavy ring is applied to the tire carcass, the latter is thoroughly filled by using a soft uncured elastic band of the Pasava gum and rubber, which is applied to the carcass and when vulcanized fills all the irregularities and presents a firm binding surface to the heavy band when the latter is applied.

It takes 25 minutes to rebuild one tire and eight can be done at a time. The company intends to establish an agency in each city and town, supplying the agent with a full equipment of machinery consisting of a steam vulcanizer, a set of separable cores and also all the hand tools necessary to do the work. A contract with an agent includes the license to use the process within his district and also includes furnishing him with the re-construction covers. The company claims that a tire of good manufacture can be re-built on an average of four times and that each re-building should give an additional 5,000 miles.

Roller Bearing Accelerator Pedal

A new type of accelerator pedal which is said to enable the driver to increase or decrease the speed of the car more gradually and easily, is being marketed by the Roller Bearing Foot Pedal Co., St. Paul, Minn. This pedal, shown in Fig. 3, depends for its action upon two rollers R and permits of easy throttle control. It is claimed to give a saving in fuel and make driving easier. The price is \$3.50.



From the Four Winds



PENNSYLVANIA Licenses Total \$850,000—

So far this year Pennsylvania licenses have been issued for approximately 72,000 pleasure cars and 5,000 motor trucks, a total higher than was registered during all of 1913. The income to the state from this source exceeds \$850,000.

Let Contracts for Club House—Directors of the Peoria Automobile Club have let the contracts for the erection of the new club house at Columbia park on the Illinois river near Chillicothe. The preliminary expenditures will aggregate \$25,000. The new building will be located on a picturesque site, 10 miles north of Peoria, and will be one of the most attractive in the state outside of Chicago.

Roadside Improvement Plan—Mayor Pillsbury of Saco, Me., set aside one day last week to be devoted to roadside improvement when residents of the highways leading to that city were requested to go out and fix up the highways. Bushes that obstructed the view, bad holes, rocks, etc., were taken care of and the result was very satisfactory to all users of the roads. Other mayors in Maine intend to take it up and the state grange has entered into the work by recommending its members to take an active part in such movements.

Motor Federation Elects Officers—At the annual convention of the Pennsylvania Motor Federation at Erie, Pa., recently, the following officers were elected: President, Robert P. Hooper, Philadelphia; vice-presidents, Albert H. Jarecki, Erie; Peter Meixell, Wilkes-Barre; Stedman Bent, Philadelphia; David Johnson, New Castle; John M. Core, Uniontown; secretary and treasurer, Paul C. Wolff, Pittsburgh. Reading will get the convention next year.

Governors to Boost Good Roads—Programs for the Ozark Trails good roads convention to be held at Tulsa, Okla., May 26 and 27 have been prepared and on the list of speakers appear the following names of men of experience, ability and oratory: Governor C. W. Major, Missouri; Governor Lee Cruce, Oklahoma; W. H. "Coin" Harvey, Arkansas, president of the Ozark Trails Association; Sidney Suggs, Oklahoma, state highway commissioner; W. S. Gearhart, Kansas, state engineer; Ben Hennessey, Oklahoma, secretary of the state board of agriculture; John Fields, Oklahoma, editor Oklahoma Farm Journal; and Cyrus S. Avery, Oklahoma, president of the Eastern Oklahoma Agricultural Association.

Look for Bumper Tourist Crop—The touring season started in California May 1 and from now on until late in October the roads in all sections of that state will be literally alive with motorists. This year gives every promise of being the biggest touring season in the history of California, for the new highways system is far enough advanced to allow the motorist to wander further away from home than ever before, and there is no doubt that before the end of summer many a owner will roll up a mileage to which he will point with pride. The Yosemite valley is to be the magnet for hundreds of motor tourists. The fact that the government is planning to modify the rules regulating entry into the reserve will mean much to increase the travel to the park, as will the improved roads leading up to the gates of the reservation. Lake Tahoe, too, promises to attract a greater number of motorists this year than ever before, and as soon as the sun has disposed of the snow at the sum-

mit of the mountains there will be a big rush for the lake. The new highway around the border of the lake will shortly be completed, which does away with the barging and permits the motorist to visit the different resorts in his car, which will make this mountain retreat more popular than ever.

Has Touring Car de Luxe—The most comprehensive continental motor tour planned by a private owner starting from Los Angeles is that of Charles W. Swett, who in a specially-built and equipped Stevens-Duryea will leave soon on a trip to the eastern coast and back. The car is arranged with seats that tip back and make a bed equal to the best Pullman berth. The interior is fitted

with reading lamps, and at the back on the trunk rack is a compact bottle and food locker. Supplies will be replenished when large towns are reached, but the entire equipment at starting will take care of the motorists' wants weeks at a time while away from civilization. A large tent is being carried that will spread over the entire car and give plenty of living room.

Hoosiers Open New Club House—The Hoosier Motor Club's new summer club house, "Crow's Nest," northeast of Indianapolis, was formally opened on the evening of May 2. There was an elaborate dinner for members only, followed by dancing. The club house is surrounded by extensive and picturesque grounds and it is believed to be one of the finest summer club houses occupied by a motor car organization in the United States.

Canadians Seek Lower Risk Rates—The members of the Automobile Club of Canada are likely to receive substantial benefit from their connection with this organization as the officers are engaged in trying to arrange for a special rate with several of the leading insurance companies. The Ontario Motor League is acting with a similar motive in view and as all the motor organizations of Canada are now joined under one title of the Canadian Automobile Federation, it is expected that at the national convention on May 21 in Montreal—in connection with the good roads congress—the insurance question will be brought up and concerted action taken for the benefit of all the club members throughout the dominion, numbering 15,000.

Milwaukee Motorists Card Team Match—The Milwaukee Athletic Club will engage the Milwaukee Automobile Club in competition for the Wisconsin Motorist trophy for the second time on Saturday, June 20, according to plans made by the joint contest boards on May 2. A route of approximately 130 miles will be laid out, covering a number of the interior towns of the state. Rules equal to grade 3 regulations of the A. A. A. will govern the run and the club team finishing with the least demerits will receive the trophy. The motor club won the plaque in the first contest on June 28, 1913, by a big score. It was at first proposed to conduct a 2-day run, but the contest boards decided to make the June 20 contest a 1-day affair and hold another in the fall. In the last contest twenty-two cars participated and there were eight perfect score cars on each side.

May Hold Fall Motor Show—A committee, consisting of Fred I. Willis, John Orman and G. O. Wildhack, has been appointed by the Indianapolis Automobile Association to investigate the feasibility of holding a fall show in connection with the Indiana state fair. The fair will be held in Indianapolis September 7 to 11. There is no building available for a motor car show, but the motor car association still has the immense tent that was used for the annual motor car show in the spring of 1912. It is proposed to take this tent to the fair grounds and in its house the exhibits of local manufacturers and dealers. The attendance at the state fair is usually from 150,000 to 200,000, bringing people to the city from all parts of Indiana. A motor car show was held in March, but it is thought that a fall show would be a great help to business. A boulevard 100 feet wide is now under construction to the fair ground and this will be completed in time for the fair.

Coming Motor Events

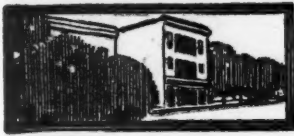
SHOWS AND CONVENTIONS

June 23-26—S. A. E. summer meeting, Cape May, N. J.
September 26-October 6—Berlin show.
October 17-24—Show, Pittsburgh, Pa.
October 16-26—Paris show.
November 6—Olympia show.
November 9-14—American Road Congress, Atlanta, Ga.

CONTESTS

May 15-16—Track meet, Columbus, O.
May 20—Roadability, Beach Haven, Pa.
May 25-26—Targa Florio race, Sicily.
*May 30—Indianapolis 500-mile race.
May 30—New York track meet.
May 30—Track meet, Providence, R. I.
June 1—Florio cup race, Island of Sicily.
June 1—Reliability, Philadelphia, Pa.
June 6-7—Track meet, St. Louis, Mo.
June 10-11—Isle of Man road races, Great Britain.
*June 18—Hill climb, Uniontown, Pa.
June 19—Track meet, Boston, Mass.
June 20—Interclub reliability, Philadelphia, Pa.
June 27-July 4—National touring week.
June 29-July 2—A. A. A. National Reliability tour.
June 30—Track meet, Sioux City, Ia.
July 3-4—Road races, Tacoma, Wash.
July 4—French grand prix, Lyons.
*July 3-4—Montamara Festo road races, Tacoma, Wash.
*July 4—Three hundred mile race, Sioux City, Ia., speedway.
July 4—Track meet, Providence, R. I.
July 4—Hill climb, Richfield Springs, N. Y.
July 17-18—Speedway races, Seattle, Wash.
July 18-19—Speedway races, Seattle, Wash.
July 30, Aug. 1 and 3—Beach meet, Galveston, Tex.
July 25-26—Belgium grand prix road races.
August 15—Le Mans cyclecar grand prix race.
July and August—French army truck subsidiary trials.
August 2-9—Six day cyclecar reliability in French Alps.
August 16—Coupe Internationale; light car race, Le Mans.
August 17—Grand Prix of France, Le Mans.
August 21-22—Road races, Elgin, Ill.
September 5—Track meet, Milwaukee, Wis.
September 6-7—Italian grand prix.
September 7—Track meet, Providence, R. I.
September 9—Speedway races, Pomona, Cal.
September 9—Road race, Corona Beach, Cal.
September 14—Track meet, Milwaukee, Wis.
September 18-19—Track meet, Hutchinson, Kans.
October—Gallion hill climb, Paris.
October 2-3—Track meet, Oklahoma City, Okla.
October 2-3—Track meet, Trenton, N. J.
October 9—Speedway race, Chicago.
November 8-11—Track meet, Shreveport, La.
November 15—Kerosene motor tests, Paris, France.
November—El Paso-Phoenix road race.

* Sanctioned by A. A. A.



Among the Makers and Dealers



FRIED with Ferro Company—Ernest R. Fried, formerly engineer with the General Motors Co., has taken an engineering position with the Ferro Machine and Foundry Co., Cleveland.

Jesco Opens Detroit Office—The Jones Electric Starter Co., manufacturing the Jesco line of electric starting-lighting-ignition apparatus, has opened a Detroit office at 1211 Woodward avenue in charge of E. L. Jones, vice-president and chief engineer of the company.

Schebler's March Production—A typographical error in the April 30 issue of Motor Age, which occurred in the article on trade conditions in Indianapolis, page 11, made it appear as if the March shipments of Wheeler & Schebler totaled 2,600 carbureters. The correct total was 26,000.

Bay State Truck Latest—The Bay State is the name of a new gasoline truck that is being built at Cambridge, Mass., by the Britton-Stevens Corp. formed recently. The plans have been made by W. C. Guildler, formerly identified with the Mack Motor Truck Co. at Allentown, Penn., who has been made vice-president and general manager of the Britton-Stevens company.

Start Work on New Plant—The Carson-Rowell Co., Appleton, Wis., manufacturing babbitt metal for bearings and other purposes, has started work on the construction of a new plant, which will enable the concern to produce about three times the tonnage of the past. The new factory has dimensions of 66x90 feet and is two stories high, with a large basement. The equipment includes twelve large furnaces, with a combined capacity of 5,000,000 pounds of babbitt metal annually.

Bock Bearing Co. in Plant—The Bock Bearing Co., a new Toledo, O., concern, has completed its plant on Phillips avenue and the Michigan Central railroad and is now ready for business. This plant is one of the most convenient and modern institutions of its size in the city. The factory foundation is 62 by 225 feet. The concern has been carrying on experiments since the first of the year and everything is now satisfactorily adjusted and the company is turning out bearings. H. A. Strong is sales manager.

Steele Truck Given Test—The first model of the new Steele truck being built by W. H. Steele at Worcester, Mass., was finished last week and is now on the streets being given a test. The wheels of the new vehicle are larger than the ordinary truck to give greater pulling power. It has a speed control devised by its maker and there are other features about it that are original. This truck already has been sold. Mr. Steele has his plant at 100 Beacon street now. He formerly built trucks from some of the parts of the Morgan truck whose interests he bought out in 1912.

Goodyear Employees Are Examined—Excellent results already are being obtained by the Goodyear Tire and Rubber Co. from a system by which every prospective employee is submitted to a physical examination. The system was installed with an examination of employees on the factory payroll January 1 of this year. The examination itself is not so formidable as it sounds, and the presence of various ailments revealed by examination does not necessarily bar candidates from employment by the company. On the other hand, the information thus obtained enables the placing of men where

they will be most efficient and can work with minimum discomfort and maximum returns for themselves. For instance, men subject to or suffering from rupture can be given light, suitable employment, etc.

Starts Manufacture of Pumps—The Hartford Tire Pump Co., incorporated by W. Heston Knickerbocker of Hartford, Wis., several weeks ago with \$10,000 capital, has commenced the production of air-compressing appliances for motor cars. Mr. Knickerbocker has been developing the device for 3 years and is now ready to market the pump. The device is direct-driven by the motor and is claimed to have the unusual advantage which permits no gaseous substance to enter the tire or pressure tank.

Recent Incorporations

Akron, O.—Pike Rubber Co., capital stock, \$50,000; to manufacture and deal in rubber goods; incorporators, O. C. Pike, F. Grether, F. Selzer, V. R. Hardy, E. V. Hammaker.

Blair, Wis.—Blair Auto Co., capital stock, \$2,500; to operate garage; incorporators, C. J. Gibson and others.

Boston, Mass.—Lawson-Pratt Sales Co., capital stock, \$5,000; motor car business; incorporators, D. Lawson, R. T. Pratt, E. E. Stanwood.

Brooklyn, N. Y.—Tomberg Auto Co., capital stock, \$1,000; incorporators, C. Tomberg, W. P. Finn, S. Barson.

Brooklyn, N. Y.—Eugene Doherty Rubber Works, capital stock, \$40,000; incorporators, P. A. Doherty, M. J. Doherty, C. T. Roe.

Buffalo, N. Y.—Vermont Garage, capital stock, \$1,500; incorporators, C. A. Volkert, E. A. Grosse, C. H. Volkert.

Cedarhurst, N. Y.—Far Rockaway Motor Bus Line, capital stock, \$21,000; incorporators, G. W. Foran, C. A. Johnson, T. A. McWhinney.

Chicago—Lomax Motor Car Co., capital stock, \$1,000,000; to manufacture motor cars.

Clintonville, Wis.—South Side Machine & Auto Co., capital stock, \$15,000; to operate garage; incorporators, W. Splitzger, F. Gerbert, A. Poetter.

Dover, Del.—Mutual Motor Service, capital stock, \$25,000.

Lynn, Mass.—Seaside Taxi Co., capital stock, \$1,000; incorporators, J. L. Swan, J. C. Welsh, W. O. Swan, S. E. Swan, H. E. Miller.

Milwaukee, Wis.—Milwaukee Garage Co., capital stock, \$3,000; to operate garage; incorporators, F. Toennhardt, Jr., E. H. Voight, A. Voight.

New York—Astoria Taxicab Corp., capital stock, \$3,000; incorporators, G. L. Doyle, W. F. Wund, A. V. Kenealy.

New York—Walter K. Hadley Co., capital stock, \$500; to deal in motor cars; incorporators, W. K. Hadley, F. J. Pillsbury, H. E. Crowder.

New York—Ghezzi Vehicle Fenders Co., capital stock, \$10,000; incorporators, D. Ghezzi, F. Tauro, A. Zerbarini.

New York—Twentieth Street Garage, capital stock, \$26,000; incorporators, J. Winsburgh, P. A. Lee, J. Dugan.

New York—Lotos Garage Co., capital stock, \$10,000; incorporators, W. A. Larney, T. J. Tracy, M. Goudchaux.

Newark, N. J.—Dobbins Automobile Exchange, capital stock, \$50,000; incorporators, H. W. Dobbins, Jr., G. Dobbins, D. C. Dobbins.

Philadelphia, Pa.—Pneumatic Shock Absorber Co., capital stock, \$100,000; to manufacture and deal in motor cars; incorporators, F. R. Hanell, George Martin, S. C. Seymoud.

Ripley, N. Y.—Burrows Cyclecar Co., capital stock, \$30,000; to manufacture cars; incorporators, J. W. Burrows, R. P. Burrows, R. Burrows.

Savannah, Ga.—Harris Tire Co., capital stock, \$40,000; to deal in motor cars; incorporators, Captain Harris, H. M. Garmany, C. S. Richardson, L. B. Rith, M. B. Brabham, J. E. Mosher, E. DeLoach, J. L. Sellers.

Wellsville, N. Y.—Wellsville Garage, capital stock, \$6,000,000; incorporators, H. B. Covell, H. Higgins, H. S. Burns.

Watertown, N. Y.—Henderson Transportation Co., capital stock, \$5,000; motor car business; incorporators, R. W. Butterfield, L. D. Butterfield, J. Nellis.

Youngstown, O.—Gillen-McVean Ambulance Co., capital stock, \$10,000; to operate ambulance and taxicab business; incorporators, A. F. Gillen, W. V. Gillen, D. McVean, J. I. McVean, F. A. Orseifer.

The factory is occupying the entire second floor of the Wittig garage at Hartford for the present and it is intended to erect a factory as soon as the demand warrants the proceeding.

Moon Making Sheet Metal Parts—The Moon Motor Car Co., of St. Louis, has installed three large and modern enameling ovens in its plant so that the sheet metal parts of machines can be made in St. Louis instead of Detroit and other cities as heretofore has been the case.

Will Manufacture Spark Plugs—The Power and Efficiency Co., Trenton, N. J., has been organized to manufacture double ignition spark plugs, the invention of M. T. Minogue, Philadelphia, Pa. Other accessories will be put on the market in the near future. The officers of the company are H. T. Caulet, president; E. F. Hooper, secretary and treasurer, and M. T. Minogue, general manager.

To Test Taylor Tires—President Fred I. Johnson, William Arter and Major Taylor of the Major Taylor Tire Co. of Worcester, Mass., have gone to Buffalo to be present at a testing of the tires invented by the former bicycle rider at the plant of the Pierce-Arrow Motor Car Co. The tires will be run 100 miles a day for 10 days and the results closely analyzed.

Truck Company Elects Officers—The board of directors of the newly organized Gallon Dynamic Motor Truck Co., of Gallon, O., has elected the following officers: W. J. Geer, president; F. W. Blehl, vice-president; George W. Nichols, secretary; N. G. Knight, treasurer, and H. B. Gregg, superintendent. The plant is now being operated, manufacturing motor trucks.

Lynch Leaves Studebaker Corp.—Leigh B. Lynch has resigned his position as superintendent of the Studebaker Corp. body and top finishing plants, thus ending a period of 4 years' connection with the corporation's production department. Prior to his work with Studebaker, Mr. Lynch was a well-known pilot of racing cars. It is expected that he will soon announce another trade connection.

Advertising Man Follows Chief—Following the resignation of George E. Daniels, vice-president and general manager of the Oakland Motor Car Co., comes the announcement that J. H. Newmark, advertising manager of the company, has followed his chief and also has resigned. Long association and a close sympathy as to policies is said to have prompted his action.

May Build at Kenosha—The Delaunty Engine Co., Chicago, Ill., recently organized to build an improved type of gasoline motor for motor car and truck purposes, has opened negotiations with the Industrial Association of Kenosha, Wis., with a view to establishing its plant in that city. The concern is headed by Guy Guernsey of Joliet, Ill., who is best known as president of the Hamilton Club of Chicago, and has splendid financial support.

New Lubricant Company Formed—There has just been formed in Worcester, Mass., the Continental Asbestos Co., a corporation with a capital stock of \$200,000, but with a privilege to make it \$1,100,000 later. The company has begun operations on a factory at 7-11 Summer street and turns out five different kinds of lubricant for use on all kinds of machines, including Spedolene for motor cars and motor trucks.



Brief Business Announcements



MARIETTA, O.—George C. Wilderman, Marietta, O., has taken the agency for Firestone tires.

New York—The Automatic Appliance Co., Boston, manufacturer of the Boston starter for Ford cars, has opened a branch at 1876 Broadway, in charge of W. C. Bordeaux.

Indianapolis, Ind.—The agency of the E-Z Rider shock absorber for Indianapolis and vicinity has been taken by W. A. Carr of Carr's Auto Place, Indianapolis.

Toledo, O.—Manager R. R. Brown, of the Brown Supply Co., has closed a deal whereby hat concern will have the distribution in northwestern Ohio of Vulcan springs.

Worcester, Mass.—John E. Whitmyer, formerly salesman for the Worcester, Mass., branch of the United States Tire Co., has been made manager of the branch. He succeeds William B. Ellenbeck, Jr., who has gone to New York to join another tire company.

Springfield, Mass.—George A. Mevis, who got his training with the Knox company and for the past 2 years was a member of the Packard forces at New York, Hartford and Springfield, Mass., has been appointed manager of the Stevens-Duryea branch in this city.

Green Bay, Wis.—The Snively Livery and Transfer Co., Green Bay, Wis., is meeting the requirements of the times by erecting a large addition to its stables, to be used for garage and repair shop. The company is one of the largest of its kind in Wisconsin and has been operating a motor livery

for some time. Upon the completion of the garage the concern will become distributor for Jeffery cars in the Green Bay district.

Hartford, Conn.—George O. Watts, of 300 Franklin avenue, has been appointed Hartford distributor of Englebert tires.

Toledo, O.—The northwestern Ohio distributing agency for the Rayfield carburetor has been secured by J. M. Connolly, who has established a sales room at 1502 Madison avenue.

Chicago—E. M. Beauchamp has disposed of his interest in the Motor Supplies Co., Chicago, and has gone to California, where he expects to locate in Los Angeles.

Milwaukee, Wis.—A garage will be established in Milwaukee by the Milwaukee Garage Co., which has just been organized with \$5,000 capital by Frank Toennhardt, Jr., E. H. Voight and A. Voight.

Oconomowoc, Wis.—The Motor Inn, Oconomowoc, Wis., will be formally opened May 15. The garage, livery and repair shops will be operated by A. E. Martin and Donald Anstey. and Forest Leaf, agent for the Ford, will occupy part of the new structure with sales rooms. The Leaf garage has been leased to Ernest Mengel.

Toledo, O.—The Landman-Griffith Co., of Toledo, O., has been made general Maxwell distributor throughout the northern half of the state and will open a branch house at 1918 Euclid avenue, Cleveland, from which point Maxwell business in the eastern part of the state will be handled. The eastern Ohio business was formerly handled directly

from the factory through a branch in Cleveland. The territory comprises forty-two counties.

St. Joseph, Mo.—The Grand Central Motor Co., of St. Joseph, Mo., has employed Charles McCullough as manager of its service department. Mr. McCullough has been with the Cole Motor Car Co., Indianapolis.

Kenosha, Wis.—The Littand Mfg. Co., Kenosha, Wis., which established a foundry for the production of Littand bronze material for bushings, etc., has filed a voluntary petition in bankruptcy. The assets are given as \$10,320 and liabilities \$29,315.

Sheboygan, Wis.—The Universal Oxygen Co., Sheboygan, Wis., operating a large welding and cutting shop, has increased its capital stock from \$50,000 to \$125,000. The concern will engage in the manufacture of a new type of apparatus.

Columbus, O.—The Electric Auto Sales and Service Co., of Columbus, recently incorporated with a capital of \$5,000, will locate at 11-15 North Fourth street and will handle the Ohio electric. Herman H. Eckhardt, Jr., will be general manager.

Milwaukee, Wis.—The Milwaukee Auto Specialty Co., Seventh and Chestnut streets, Milwaukee, Wis., manufacturing bumpers, tire irons, spark plugs and other devices and accessories, has established a motor car clearing house in connection with its public garage, recently opened. E. Vosburgh, formerly owner of the Vosburgh Auto Sales Co., Milwaukee, has been appointed manager. The Masco garage gained

Recent Agencies Appointed by Motor Car Manufacturers

PASSENGER CARS

Town	Agent	Make	Town	Agent	Make
Augusta, Ky.	J. R. Carter	Case	Denton, Tex.	Holloway & Bishop	Maxwell
Arapahoe, Neb.	A. Benjamin	Maxwell	Dassel, Minn.	Dassel Motor Co.	Maxwell
Antigo, Wis.	George H. Maxwell	Oakland	Detroit, Mich.	Grant Brothers	Chandler
Bowling Green, Ky.	Warren County Hardware Co.	Case	Dallas, Tex.	J. W. Couchman & Co.	Chandler
Bardstown, Ky.	J. R. Grigsby & Sons	Case	Fulton, Ky.	I. H. Read	Rambler
Baldwin, Mo.	Milton Bopp	Regal	Eustis, Neb.	J. L. Easterday	Maxwell
Belleville, Ill.	George Erdman	Jeffery	Embsen, N. D.	C. J. Buck	Maxwell
Brownwood, Tex.	Bouldin & Wheeler	Maxwell	El Paso, Tex.	Lee Moor	Franklin
Brookings, S. D.	F. C. Fryer	Maxwell	Ensley, Ala.	Barrett & Knapp	Maxwell
Bellingham, Wash.	Thomas S. Dahlquist	Maxwell	Fremont, O.	William H. Babione	Saxon
Batchtown, Ill.	Zigrang Brothers	Maxwell	Falls City, Neb.	Smith Motor Co.	Chandler
Bathgate, N. D.	J. W. Scott	Maxwell	Grand Gorge, N. Y.	Tompkins & Truesdell	Maxwell
Binghamton, N. Y.	New York Sales Co.	Chandler	Houston, Tex.	L. O. Brown	Partin-Palmer
Buffalo, N. Y.	Clemens Motor Sales Co.	Chandler	Hopkinsville, Ky.	Sam Metcalf	Case
Belle Plains, Ia.	Wehrman & Burns	Chandler	Holdrege, Neb.	Western Motor Car Co.	Maxwell
Butler, Pa.	Atwell Auto Supply Co.	Chandler	Holbrook, Ariz.	Charles Jarvis & Sons	Haynes
Cynthiana, Ky.	Williams & Giles	Case	Hartford, Conn.	New England Garage Co.	Haynes
Carrollton, Ky.	C. Dewese	Case	Hanford, Cal.	J. R. Hayes	Maxwell
Chaffee, Mo.	O. Sample	Regal	Holbrook, Ariz.	Thorwald Larson	Maxwell
Columbia, Mo.	West & Vanetta	Jeffery	Harrisburg, Pa.	Andred Redmond	Chandler
Chillicothe, Mo.	Adams & Sons	Cole	Jackson, O.	McCoy Brothers	Maxwell
Cygnat, O.	G. E. Grant	Ford	Jacksonville, Fla.	Winchester Motor Car Co.	Franklin
Columbus, O.	Herman H. Eckhardt, Jr.	Ohio	Kirksville, Mo.	W. A. Hunsacker	Cole
Cadiz, O.	C. A. Young	Ford	Kingsburg, Cal.	Robert Gustafson	Maxwell
Columbus, O.	Brasher Motor Car Co.	Cole	Knoxville, Tenn.	Thomas J. Cullinan	Chandler
Colon, Mich.	H. L. Hobday	Maxwell	Los Angeles, Cal.	Earl Y. Boothe	Lewis
Colfax, Ia.	Tom E. Jordan	Maxwell	Los Angeles, Cal.	Chandler Motor Car Co.	Chandler
Chester, O.	D. D. Ridenour	Maxwell	Lexington, Ky.	C. O. Updike	Rambler
Campbell, Minn.	Weber & Wischhover	Maxwell	Lancaster, Ky.	J. R. Mount & Co.	Case
Chico, Tex.	H. C. T. Robinson	Maxwell	Litchfield, Ill.	Peter Cavallo	Regal
Council Bluffs, Ia.	Skipton Motor Car Co.	Oakland	Lawrence, Mass.	Edwin C. Merrill	Maxwell
Council Bluffs, Ia.	Skipton Motor Car Co.	Oakland	Litchville, N. D.	Hanson & Holte	Maxwell
Clarion, Ia.	W. Peterson	Oakland	Lincoln, Neb.	Ryan Motor Car Co.	Franklin
Chester, S. C.	Hardin Motor Co.	Chandler	Laramie, Wyo.	Will Goodale	Maxwell
Dallas, Tex.	Tex. Motor Car & Truck Co.	Partin-Palmer	Lorain, O.	Schnable & Burns	Chandler
Delta, O.	W. E. Seeley	Buick	Lynchburg, Va.	Jack Adams	Chandler
Detroit, Mich.	F. H. Hill Co.	Haynes	Los Angeles, Cal.	Chandler Motor Car Co.	Chandler
Decatur, Ind.	Peterson & Tumbleson	Maxwell	Little Rock, Ark.	Tedford Auto Co.	Chandler
Dothan, Ala.	Tennille & Brown	Maxwell	Montreal, Que.	Gadbois, Ltd.	Overland

considerable fame shortly after its opening by the establishment of a "motor laundry," where cars are washed and polished while the owner waits.

Seattle, Wash.—F. B. Kendall is the new manager of the Firestone Tire and Rubber Co. in Seattle.

Hartford, Conn.—The Britton Co. has been appointed distributor for Stromberg motor devices. This agency was until recently held by the J. M. Macdonald Co., of Wethersfield. The new agency will be active in Hartford, Tolland and Middlesex counties.

Indianapolis, Ind.—S. D. Bromley and William H. Wilson have taken over the Claypool Garage at 27 North Capitol avenue, Indianapolis, and will organize a company to do a repair and storage business and handle used cars. The garage has been closed for some time.

Beloit, Wis.—F. J. Meloineck, Beloit, Wis., has broken ground for a machine shop and garage building at 406 Euclid avenue, Beloit. He will install a complete equipment of machine tools and welding and cutting apparatus and specialize in motor car repairs.

Minneapolis, Minn.—The Storage Battery Station has begun business at 1409½ Hennepin avenue to take care of electric starting and lighting systems, battery work and charging. Members of the company have found economical results from a battery which they have invented.

Milwaukee, Wis.—C. Edwin Newmann, Milwaukee, Wis., for several years assistant manager of the Milwaukee branch of the Fisk Rubber Co., has organized a new tire and supply concern in association with M. D. Wink. The name is Broadway Tire and Supply Co., and headquarters are at 545-547 Broadway, Milwaukee. The firm will act

as distributor for Portage tires and conduct a tire repair shop.

Seattle, Wash.—C. C. Evans, for some time associated with the Northwest Buick Co. in Seattle, has left to join the Commerce Motor Car Co. at Oakland, Cal., where he will act as manager for that company.

St. Louis, Mo.—The Woods Electric Vehicle Co., of St. Louis, has appointed a new sales manager, Louis Goodhart, a former St. Louis dealer. Recently he has been a traveling salesman for an electrical company.

Kewaunee, Wis.—The Marvel Motor Works, Kewaunee, Wis., have been purchased from the Dishmaker interests by John Klemish & son and Adolph Hamacheck, of Kewaunee, who will continue the manufacture of motors and do general motor repairing and reconstruction work.

Anderson, Ind.—J. D. Hopper, formerly with the Hamilton Scale Co. of Hamilton, O., has become affiliated with the service department of the Remy Electric Co. of Anderson, Ind., J. L. Elwood having resigned to take a position with the Eureka Manufacturing Co. of North East, Penn., as general superintendent.

Iron River, Wis.—The Iron River Hardware Co., Iron River, Wis., has purchased two lots and awarded contracts for the erection and equipment of a public garage, 30 by 80 feet in size and two stories high. George Dargie, proprietor of the company, will act as manager of the garage. Agency lines have not been selected.

Kansas City, Mo.—The Samson Iron Works Co., of Fresno, Cal., manufacturing the 2-ton Samson farm and orchard tractor, has opened an eastern selling branch here. H. W. Montgomery is in charge and offices have been obtained with the Mid-West Sales Co., 1715 McGee street. The company

plans an invasion of the eastern territory. The campaign will be directed from here.

St. Louis, Mo.—Harold C. Brouster, formerly connected with the distribution of the Baker electric and later sales manager of the White company, has taken charge as sales manager of the Rauch-Lang St. Louis company. He succeeds Adolph Zuest, Jr., who resigned to take up a position in another field.

St. Louis, Mo.—The Miller Tire and Rubber Co., of Akron, O., has appointed Clifford L. Garrison, of the Phoenix Auto Supply Co., manager of its newly opened St. Louis branch. E. W. Staley, former manager of the local Diamond Rubber branch, will be the traveling representative in Illinois and Missouri.

Buffalo, N. Y.—The Buffalo Foundry and Machine Co., of Buffalo, N. Y., announces that it has terminated the arrangement whereby H. E. Jacoby has been representing it in New York and vicinity. It is now handling direct all inquiries covering vacuum apparatus, castings, patterns and machine work.

Minneapolis, Minn.—The Twin City cycle-car is the latest production of Minneapolis motor factories. It is manufactured by R. R. Griffith, who claims that he could sell 2,500 cars this season if he could deliver them. The first car was built for C. H. Scholer for use in the Twin Cities. It was such a success that general construction has begun.

Columbus, O.—The Armstrong-Johnson Co., of Columbus, O., which was incorporated recently with a capital of \$10,000, is a partial reorganization of the Barndt-Johnson Co., of South Columbus, which went into the hands of a receiver a year ago. The company will make motor car tops, bodies and other supplies, and will locate a plant on the north side. W. R. Johnson was elected president.

Recent Agencies Appointed by Motor Car Manufacturers—Continued

PASSENGER CARS

Town	Agent	Make	Town	Agent	Make
Maysville, Ky.	J. D. Keith	Case	Pitcairn, Pa.	Pitcairn Auto Co.	Maxwell
Millersburg, Ky.	E. B. Taylor	Case	Riverside, Pa.	W. A. Hoover	Chandler
Memphis, Mo.	Hudson & Fravel	Jeffery	Raleigh, N. C.	Wake Auto Co.	Chandler
Montreal, Que.	Gareau Motor Car Co.	Cole	Raton, N. M.	E. J. Love Motor Co.	Haynes
Fostoria, O.	Willis J. Hakes	Ford	Roberta, Ga.	Seagler Brothers	Maxwell
Maynard, Mass.	J. A. Coughlan	Maxwell	Spokane, Wash.	Rocket Cyclecar & Supply Co.	Rocket
Mt. Carmel, Pa.	P. H. Tye	Franklin	St. James, Minn.	Fred H. Klaras	Maxwell
Montgomery, Ala.	L. J. Pake	Maxwell	Stamps, Ark.	Sanders & Purser	Maxwell
Marietta, O.	Walter W. Wood	Maxwell	Stockton, Cal.	Stockton Garage	Maxwell
Marietta, O.	Theodore Riddle	Paige-Detroit	Sturgis, S. D.	M. R. Debbins	Maxwell
Morris, Ill.	Bert Thorson	Maxwell	Salinas, Cal.	C. S. Nuttall	Maxwell
Minersville, Utah	A. L. Dolson	Maxwell	Sedro Woolley, Wash.	State Street Garage	Maxwell
Marion, Ind.	Stoebe-Helson Co.	Maxwell	Stamford, Conn.	Ideal Garage	Maxwell
Muscatine, Ia.	Banker Auto Co.	Chandler	Spalding, Neb.	F. J. O'Hara	Maxwell
Montreal, Que.	Erligon & Baker	Chandler	Springhill, La.	M. A. Stephens	Maxwell
Montreal, Can.	Frigon & Baker	Chandler	Stanford, Ky.	H. C. Carpenter	Maxwell
New London, Conn.	Palmer's Garage	Maxwell	Siloam Springs, Ark.	Farmer & Perry	Maxwell
New Leipzig, N. D.	Val Horner	Maxwell	Starkweather, N. D.	Resler & Fawcett	Maxwell
Norwalk, O.	William Muehlfeld	Grant	Seattle, Wash.	Seattle Automobile Co.	Premier
New Castle, Pa.	Atwell Auto Supply Co.	Chandler	Scranton, Pa.	Lackawanna Auto Co.	Maxwell
Nashua, N. H.	Chandler Motor Car Co.	Chandler	Temple, Tex.	J. M. Lee & Co.	Partin-Palmer
Nevada, Ia.	J. Knudson	Chandler	Taylor, Tex.	Hoch Hardware Co.	Partin-Palmer
Oklahoma City, Okla.	Briggs-Detroit Automobile Co.	Detroit	Toledo, O.	Cornelius Auto Sales Co.	Krit
Owensboro, Ky.	Jesse & Forgry	Case	Trenton, N. J.	H. J. Stout	Chandler
Oakland, Cal.	Muller Auto Garage	Reo	Toronto, Can.	Brintnell Motor, Ltd.	Chandler
Owosso, Mich.	F. E. Hartshorn	Maxwell	Upperco, Md.	J. F. Armacost & Son	Maxwell
Oregon City, Ore.	P. A. Schmidt	Maxwell	Vine Grove, Ky.	A. F. Vertrees & Son	Maxwell
Oklahoma City, Okla.	Herrick & Vanderwoort	Maxwell	Winchester, Ky.	Peoples Motor Co.	Case
Paris, Ky.	Redmon Bros.	Case	Waco, Tex.	W. M. Oden	Haynes
Pensacola, Fla.	J. E. Nicholas	Maxwell	Waynesboro, Pa.	J. C. F. Groh	Maxwell
Portland, Ore.	Nob Hill Garage & Auto Co.	Haynes	Whittemore, Ia.	Swanson & Son	Oakland
Philadelphia, Pa.	Bridge & Whitney Cyclecar Distributing Co.	O-We-Go	Wauseon, O.	Miller & Hoy	Chevrolet
Potsdam, N. Y.	Frank A. Seaver	Maxwell	Wauseon, O.	David Myers	Buick

COMMERCIAL CARS

San Francisco, Cal.	Pacific Mogul Co.	Mogul	Denver, Colo.	W. W. Barnett	Stewart
Milwaukee, Wis.	Imperial Motor Sales Co.	Stewart	Detroit, Mich.	Siegel-Zeckendorf Co., Ltd.	Stewart
Omaha, Neb.	Murphy & Sons	Stewart	Seattle, Wash.	Bruce Osthlmer	Selden
Indianapolis	Pierce-Arrow Motor Car Co.	Stewart	Indianapolis, Ind.	Frank C. Carey	Commerce

The Motor Car Repair Shop

IN this department last week the three methods of removing carbon, namely by kerosene, oxygen and alcohol, were discussed and the last method, by hand scraping, will now be outlined.

Usually three scrapers are required to perform the operation and these may be obtained at any supply store.

The first step in scraping carbon is to drain the oil out of the crankcase and, if possible, take off the cover of the oil reservoir. The cylinder plugs should be removed and, if possible, the water-jacket cover. The reason for the latter step is that scraping may be done through the plug in the water space. Especially is this valuable in L-head motors.

All the valves should be taken from the motor and the magneto and carbureter and other parts covered with cloth so that no carbon dust makes its way to these parts. In taking the valves off, place them to one side, in order that they are removed, so that in replacing, the valves will be put back in their proper places. In all cases the valves are numbered, but on old motors the numbers are not visible. Mark them with chalk according to their location. If the motor has a removable cylinder head the work will be done very effectively and more easily with the head removed.

It is necessary sometimes to have the scrapers designed for the motor which is to be scraped, for the tools bought at the supply store are often not of the required shape. In Fig. 2 are shown three forms of carbon scrapers: A, for use for scraping the top of the piston; C, for the cylinder head, and, B, for the cavities around the valves.

How to Use the Scrapers

The scraper, A in Fig. 2, or, in other words, the scraper with a flat scraping surface, should be used first. The instrument should be drawn back and forth across the piston head and the operation repeated until a scratching sensation disappears. The scratching is due to the scraper cutting the caky carbon. Care should be taken not to scrape the metal. After as much of one side of the piston as possible has been scraped the other side should be tried. That is, the scraper should be inserted through the plug on the other side of the cylinder. This, of course, applies only to T-head motor, but in those of the L-head type the scraping may be done almost as effectively by scraping through both intake and exhaust valve plug openings. The motor should not be turned over while carbon is being scraped, for then the particles make their way to the piston rings. A blast of compressed air should

Carbon Removing Methods

the scraper in use will not do the work the small scraper lettered B in the illustration.

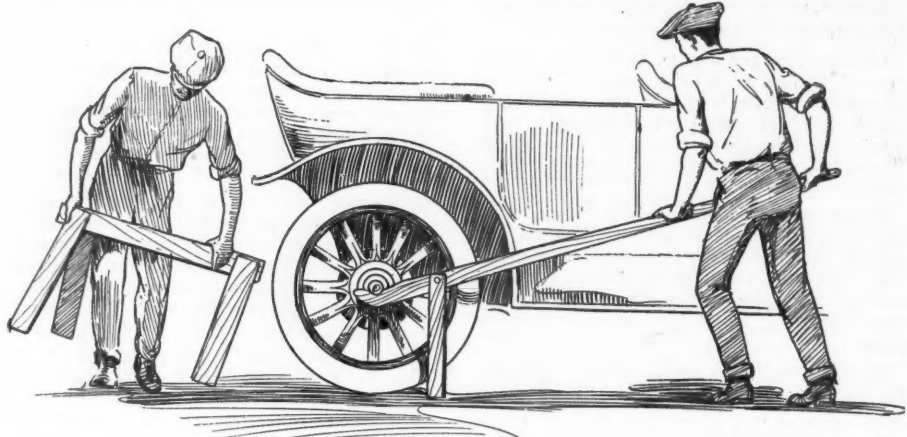


FIG. 1—A SIMPLE QUICK-LIFTING JACK WHICH CAN BE MADE EASILY

be applied to the cylinders every few minutes to blow out the carbon that has been scraped. A hand air pump usually does the work well.

After the piston has been thoroughly scraped the cylinder head should be looked after. It is difficult to obtain a scraper that will suffice for every make of motor. The curvature of the scraper for the cylinder head should be equal to the curvature of the top of the cylinder, or nearly so. But often this is not the case and it remains to use the scraper at hand or have a blacksmith make one. If it is found that

tion should be used. This is intended for use around the valve chambers only, but often it is suitable for scraping in other places.

Scraping should continue from as many positions as possible until a blast of compressed air forced into the cylinders does not blow out any carbon dust.

After as much carbon as possible has been taken from the cylinders a half-tumblerful of kerosene should be poured into each cylinder and the air blast applied. Another half-tumblerful of kerosene should be poured into the cylinders and the motor turned over a few times. The oil reservoir should be cleaned thoroughly with a clean cloth previously soaked in gasoline. It is customary to grind the valves after having scraped carbon.

Quick-Lifting Jack

A very simple form of all-wood quick-lifting jack is illustrated in Fig. 1. This type was in use in a prominent motor car factory for lifting the rear end of a car so that wooden horses could be pushed under the axle housing to support the vehicle. In the shop in question, one side of the car was lifted first and the horse slipped under and then the other side was raised. As will be noticed, the jack consists of a long lever with a depression at one end for fitting under the hub of the wheel. The lever is pivoted at a point about 2 feet from the depression. The upright portion upon which the lever is supported is a simple mortise and is attached to the lever by a metal pin. This jack, of course, will lift the car only a fixed distance and in the shop referred to this was sufficient so the rear wheels cleared the floor. The cheapness of the jack should appeal to many.



Fig. 2.—Four varieties of scrapers for removing carbon. The lower one is a universal tool used for the piston, cylinder head and valve chambers

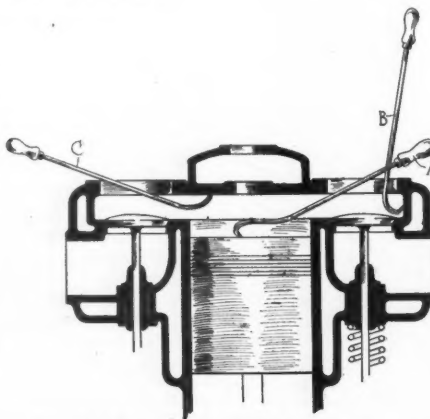


Fig. 3.—How the scrapers shown above are used. Scraper A is used for the top of the piston, B for the cavities around the valves and C for the cylinder head

Shock Absorbers Are Unnecessary to Properly Designed Springs Equipped with

The DANN OIL CUSHION SPRING INSERT

The existence on the market of numerous types of coiled spring and auxiliary spring shock absorbing devices is an indirect inference that spring manufacturers do not know their business. One would be led to believe that springs *needed* support because they were not rightly designed.

A properly designed spring made by spring specialists is just as close to 100% efficiency as engineering practice will permit. If springs *need* additional support their makers discover the fact long before the first car to be sold is mounted on springs. Properly designed springs on a new car—although somewhat stiff—absorb direct road jolt and jar, protect a car's mechanism and passengers from direct road shock, as perfectly as possible, *and without the aid of auxiliary springs or auxiliary spring type shock absorbers.*

The only trouble with new springs is that they will *not* retain their original efficiency if permitted to dry or rust. Spring manufacturers intend that their springs should be properly taken care of—that they should be properly lubricated, not only when the car leaves the factory, but continuously throughout the car's life of service. *They know that a perfectly and permanently lubricated spring is the best natural shock absorber.* A dry, rusty, stiff spring is not the spring the manufacturer meant it to be. Nor will it give the results the spring manufacturer intended it should.

From the beginning of the automobile industry till the appearance of DANN Insert, no means had ever been devised for *permanently* retaining lubricant between spring leaves. Until very recently it was taken as a matter of course that lubricant would soon squeeze out from between the spring leaves—leaving them to dry, rust and "set," if not given proper and immediate attention. The only way out was to pry the leaves apart every so often, and attempt to insert lubricant between them with a table-knife. The

trouble with this method was that a spring in *place* on a car could not be *thoroughly* lubricated. Moreover, it wouldn't *stay* lubricated. Consequently springs were generally neglected—permitted to dry and rust and lose, to a very great extent, their shock absorbing qualities.

DANN Insert was the first device on the market to solve satisfactorily the problem of perfect and permanent spring lubrication. It was the first device that made unnecessary the dirty and inconvenient job of lubricating a spring by hand every few weeks. Most important of all, it was the first device that enabled motorists and car manufacturers to get *all* the shock absorbing qualities in a spring *out* of it.

DANN Insert is a thin, perforated strip of specially compounded metal, designed to be inserted from tip to tip between spring leaves. The perforations in the Insert are packed with a heavy lubricant.



X-Ray view of spring equipped with DANN Insert, showing how the oil-packed strips of Insert are placed between spring leaves

DANN Insert *retains* the lubricant between spring leaves *indefinitely*. The lubricant can't squeeze out. The leaves can't dry, rust or "catch." They

must slide freely over one another. As a result, springs equipped with DANN Insert retain *permanently* the flexibility and the sensitive shock absorbing qualities the spring manufacturer meant them to retain.

Ask Your Dealer or Write Us Direct for Sample of Insert and Full Descriptive Literature.

DEALERS WANTED EVERYWHERE

FORD MOTORISTS! The Schaefer Sales Corporation, 1501 Arcadia Building, Detroit, Mich., is prepared to supply the trade and Ford owners with DANN Ford Insert—cut to proper lengths, neatly packed in a box, and ready for immediate installation between the spring leaves of any Ford car. Complete instructions accompany each order, making it an easy matter for you or your garageman to "Oil Cushionize" your Ford springs with the utmost despatch.

"Oil Cushionize Your Springs!"

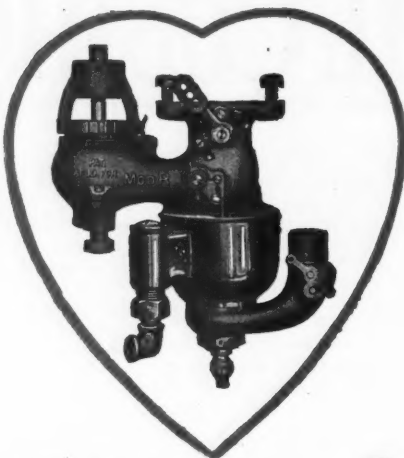
Dann Oil Cushion Spring Insert Company
2252 Indiana Avenue, Chicago, Illinois

Put Dann Insert on Your Old Car—Demand It on Your New Car

The Insert of 10,000 Oil Pockets

When Writing to Advertisers, Please Mention Motor Age.

1,500,000 SCHEBLER

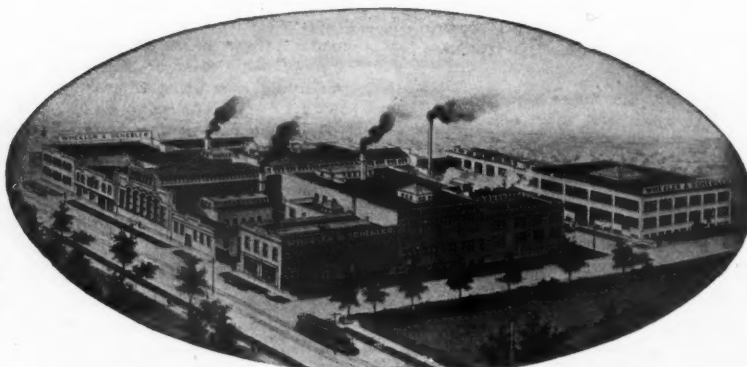


Carburetors In Use!

When a motor mechanic sees a Schebler on a motor he welcomes it as an old friend.

Do you want service and satisfaction? We give service—our instruments satisfaction.

The
Factory
Behind—



The
Schebler
Carburetor

Daily Capacity, 4000 Instruments

WHEELER & SCHEBLER, Indianapolis, Ind.

"Pioneers in Perfection of Carburetion"

BRANCHES:

Fry & McGill Motor Supply Co. Denver, Colo.
Automobile Accessories Co. Pittsburgh, Pa.
Ferris-Dunlap Auto Supply Co. Dallas, Tex.
Interstate Electric Co. New Orleans, La.
Reinhard Bros. Co. Minneapolis, Minn.

Manufacturers' Supply Co. Philadelphia, Pa.
Weinstock-Nichols Co. Los Angeles, Cal.
Pennsylvania Rubber & Sup. Co. Cleveland
Wheeler & Schebler. Chicago
Wheeler & Schebler. Detroit

Fred Campbell. St. Louis, Mo.
W. J. Connel. Boston, Mass.
Equipment Co. Kansas City, Mo.
Elyea-Austell Co. Atlanta, Ga.
J. C. Nichols. New York City
Weinstock-Nichols. San Francisco

Fairbanks, Morse & Co., Ltd., London, England
Canadian Fairbanks-Morse Co. (All principal Canadian cities)

THE KLAXON

*Thirty-five dollars*

The Hand Klaxon costs ten dollars; the Klaxet, twelve; the Klaxonet, twenty. Each has its place.

But in every community there are those who do not ask the price; who want the best there is—whether it be a car, a watch or a warning signal. For these—the Klaxon. It is the highest priced signal made—and the highest grade. You will find it today on ninety-five per cent. of all the best cars throughout the world.

LOVELL-McCONNELL MFG. COMPANY
MAKERS OF THE "KLAXON" NEWARK N. J.



Rear-Admr. Badger

In a Crisis Every Part is Vital

An order given may put into motion complicated mechanisms that are themselves dependent on parts and materials sometimes considered unimportant.

The old story of a battle lost for the want of a horse-shoe nail is based on historical fact.

Today, on a modern battleship, should some piece of electrical apparatus "want" current and not get it at the required instant, a modern battle might be lost. On such small things hang success or failure. Engineers in the Navy Department, trained to foresee and guard against failure of any part, specify

Packard

CABLE

For this same reason—dependability—you will find Packard Cable on the high-grade motor cars and motor boats, indeed in any place where reliability and service are the first consideration.

DEALERS PLEASE READ CAREFULLY AND CONFORM TO INSTRUCTIONS.

S. and A.
Form No. 103.

W

Letters on this subject should refer to the number of the requisition and the name of Bureau.

To be shipped immediately after Government inspection.

ORDER FOR SUPPLIES OR SERVICES.

U. S. Navy Pay Office,
Norfolk, Va.

April 7, 1913.

The Packard Electric Co.,

Warren, Ohio.

In conformity with your proposal dated March 20, 1913 please deliver at the place specified below, all charges prepaid, subject of delivery, the following supplies, to be delivered promptly and

ARTICLES

REQUISITION No. 907

Send for our new folder showing samples of Ignition, Starting and Lighting Cable in actual size and natural colors, also Circular No. 3, which tells you about Packard Cable—How it is made and why it is best.

The Packard Electric Co.
Dept. C Warren, Ohio

(95)



This Map Is Not Shot Full of Holes

It is reproduced to indicate that the whole United States is shot full of **GLBA** Service Stations.

It has always been our desire to produce the best storage battery the world has ever known.

The leading car manufacturers and electrical engineers of this country and Europe say we have succeeded and the immense number of car makers who have adopted it is the evidence.



Storage Batteries

are not only thoroughly good when new, but we have arranged to keep them good in service.

Scattered over the United States, we have 176 Service Stations, every one of which is at your command to insure the best of satisfaction and the longest possible life from **GLBA** Storage Batteries.

No other battery manufacturer in the world has ever dreamed of taking such splendid care of battery users.

When you buy your new car or a new battery, insist absolutely on having an **GLBA**. You can't afford a cheap battery which has no service stations. It is the most expensive in the long run.

GLBA Willard Storage Battery Co., Cleveland, Ohio **GLBA**

New York Branch: 136 W. 52nd St.
Chicago Branch: 2241 Michigan Ave.

Indianapolis Branch: 318 North Illinois Ave.

Detroit Branch: 736-740 Woodward Ave.
San Francisco Branch: 821 Monadnock Bldg.

SERVICE STATIONS IN ALL PRINCIPAL CITIES IN THE UNITED STATES, CANADA AND MEXICO

(100)

THE VULCAN ELEC

THE American Automobile Manufacturer is acknowledged by the world as the most progressive in his class. This is evidenced by the enormous strides made in a few years by this industry. No maker has ever wilfully opposed any improvement which he felt would be for the betterment of the industry, meet with approval of the public, or add to the comfort and convenience of the owner. The history of the motor car business shows this.

But Note This:

The manufacturer does not make a vital change in his car, until the dealers and general public are ready for it. ***The manner in which starting and lighting systems were adopted proves this.*** The makers were ready to add these improvements several years before the public demanded them, but it was not until the demand arrived that they felt justified in incorporating them in their new designs.

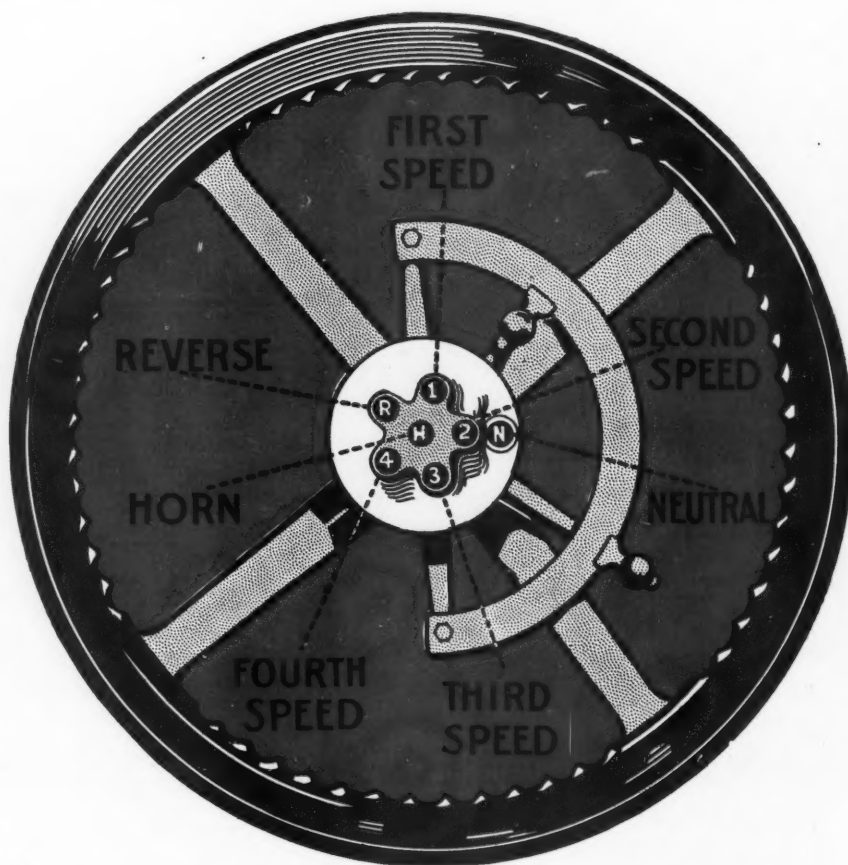
Then within six months, nearly every progressive maker had added this now accepted improvement. Everybody wonders why it was not done before. The manufacturers know why. There was no demand for it, because the general public had not yet realized how extremely logical its use would be—how easy it would be to operate, etc. The same peculiar conditions have surrounded the changes from rear entrance tonneau to side door cars; the increase in number of cylinders; the change to center control; left-side drive; the use of foredoors; and other changes and improvements, ***now*** recognized as beneficial and highly desirable.

The Automobile dealer occupies an important and strategical position in the trade

It is he who feels the public pulse—he who advises the manufacturer as to what is to their mutual interest to incorporate in the next year's model—he who, in turn, has to sell it. ***It is he who appreciates***

most keenly the advantages which the addition of serviceable and needed improvements always brings.

Engineers have for years been striving to displace the unhandy and cumbersome manual gear shifting mechanism; safe enough, if you please, in the hands of an expert, but often dangerous in the hands of a novice.



TRIC GEAR SHIFT.

As in starting devices, so in this—mechanical substitutes were tried, but everyone knew that eventually a suitable electric system would be built which would displace them all, and give perfect and reliable service in a simple manner.

The general movement in design is toward things electrical, because electric control invariably makes for simplicity, safety, accuracy, and reliability, and eliminates the need for muscular effort, making it possible for a *woman* to enjoy those things which her lack of muscular strength and general aversion to mechanical things has prevented her from using.

It is a well known fact that the average woman prefers an electric, because she knows she can control it, no matter how powerful it may be, by the simple pressing of a button or the movement of a light hand controller.

The manual gear shift is an obstacle to the aspiring motorist, who dreads that inevitable moment when, in congested traffic or on a steep, slippery hill, he must take his eyes from the road and release his hand from the steering wheel, and grope vainly for a shifting lever, upon the movement of which his very life may depend.

No more of this! The Vulcan Electric Gear Shift has solved the gear shifting problem

It makes the big gasoline car as easy to drive as an electric. The method is as old as the hills, the device is simply a *new* application of the old, well known principle. *It's just a push button and an electro magnet.*

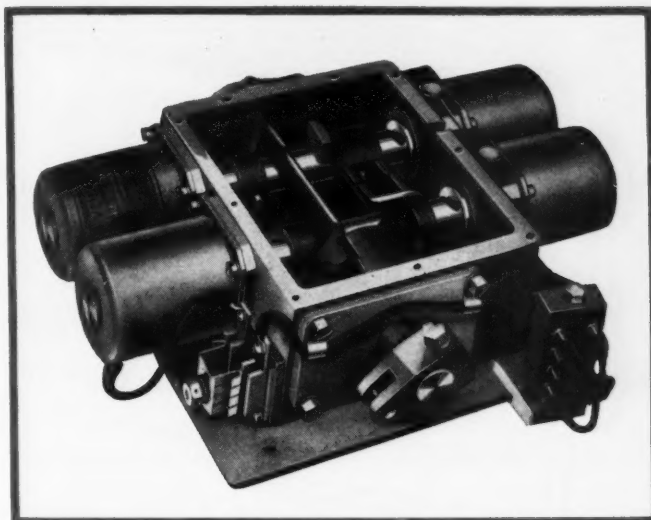
It is as simple as can be—just press the button. It is absolutely reliable, so easy to operate that the timid woman can learn to drive, and to control the most powerful gasoline car.

Best of all—it *has no complicated parts, no delicate mechanism*; just a simple electro magnet that performs for you the function that your hand and arm were compelled to, before.

It's as easy to incorporate in the car design, as it is simple and convenient. *You can have it now, if you want it.*

Every 1915 car ought to have it on

Manufacturers are preparing their models for 1915. A number have already adopted the Vulcan Electric Gear Shift as



standard equipment; many others are hastening to fit it to their design, both here and abroad.

If You Are An Owner—

You are entitled to the best system of control that your money will buy. *It should be electrical.* The Vulcan Electric Gear Shift is the simplest and best. You can have it, if you choose.

If You Are A Dealer—

You know the added value of the new and important talking point, the added value of *electrical* improvements. Remember, when lighting and starting were adopted, how those cars equipped with the best systems, jumped ahead in sales and in the estimation of the motorwise public. Make sure your 1915 cars carry this vital electrical improvement. *If you want the electric gear shift, want the advantage that its use will surely bring, now is the time to signify your desire.*

If You Are A Manufacturer—

You can't afford to ignore the growing demand for *electrical* control. Now is the time to investigate the Vulcan Electric Gear Shift before your competitor "beats you to it."

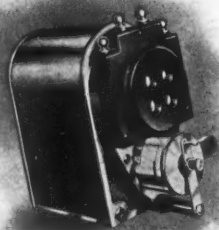
Full particulars on request.

Vulcan Electric Gear Shift Dept.

Cutler-Hammer Manufacturing Co.

Milwaukee, Wisconsin

CONNECTICUT AUT



CABLE ADDRESS: "TELEPHONE"
LIEBERS, A.B.C. on W.U. CODE.

CONNECTICUT STANDS FOR QUALITY
The Connecticut Telephone and Electric Co.
INCORPORATED
MANUFACTURERS OF
Automobile Ignition Specialties and Accessories.
MERIDEN, CONN.

May 14, 1914.

Subject: AUTOMATIC IGNITION.

Professional Men in the Trade,
Automobile Factories,
Automobile Centers, U.S.A.

Gentlemen:--

For some years we have not had much to say to you on the subject of battery ignition--not since the days when magnetos replaced the old vibrating coil. In 1909 the magneto had become a serious factor in the ignition field. It was an easy and natural step for us to enter the magneto field, which we did early in 1910.

In our endeavors to make a magneto which could cope successfully with automobile ignition, we were confronted with the obstacle of building a magneto as it should be, at a commercially practicable price. Connecticut Magnetos always did produce a spark adequate for starting (hand cranking), and even at test speeds of 4200 R.P.M., their timing was perfect. But the cost of building these magnetos made their price almost prohibitive--at least commercially prohibitive--so we turned our attention to an ignition system, which, utilizing the inexhaustible current supply of lighting batteries, would give better results than is possible with any other form of ignition.

Not only have we accomplished this result, and not only does Connecticut Automatic Ignition give absolute synchronism, not only does it deliver a hotter and more effective spark at every engine speed than a magneto is capable of at best--not only these vital benefits are accomplished by Connecticut Automatic Ignition, but it is infinitely less complicated both in construction and operation than any other type of ignition apparatus.

Inasmuch as practically every car now is equipped with an electric lighting system, and inasmuch as several manufacturers already have adopted this ignition for 1915, we feel that it is the proper time to make our announcement to the trade and those professionally interested in automobiles and their equipment. This announcement has been withheld for somewhat over a year owing to our determination to test it thoroughly and exhaustively at the hands of average drivers.

We warn you in advance to expect something radically different from conventional ignition practice. If the Connecticut were not radically different, it would not attract any more atten-

OMATIC IGNITION

THE CONNECTICUT TELEPHONE & ELECTRIC CO., INC.
SHEET No. 2,

tion than the advent of a new magneto, but.....when we ask for the opportunity of demonstrating and proving to your satisfaction that Connecticut Automatic Ignition gives better results, that is

PRODUCES A MORE EFFECTIVE SPARK AT ANY AND ALL SPEEDS THAN A MAGNETO OR ANY OTHER DEVICE

IS FREE FROM BOTH MECHANICAL AND ELECTRICAL LAG

INSURES ABSOLUTE SYNCHRONISM AT ANY SPEED--and

REQUIRES THE MINIMUM OF ATTENTION--NO ADJUSTMENT WHATEVER

you are interested, are you not?

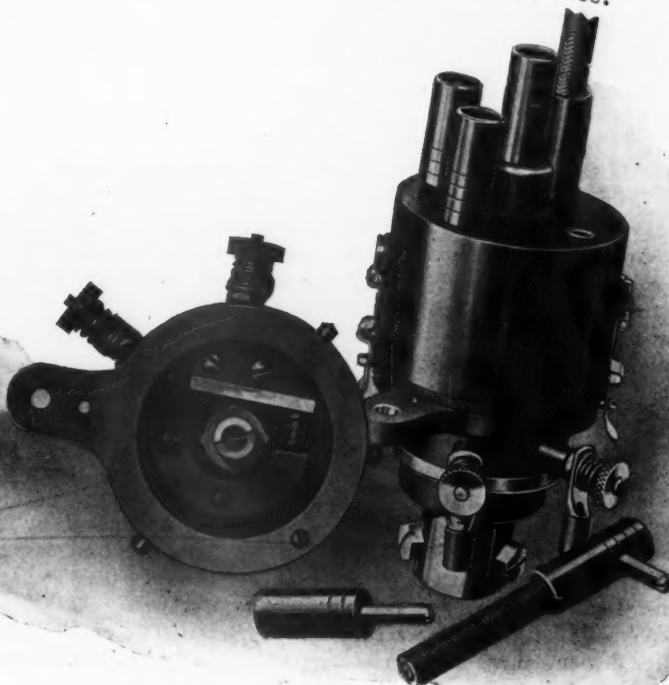
With over twenty years of experience as manufacturers of electrical instruments of precision--some nine of which have been devoted to battery and magneto ignition, and for the past two years, to this automatic system--we feel that the Connecticut Automatic Igniter merits your attention.

The commercial soundness of this company, and the universal regard which its products always have commanded, is sufficient guarantee of good faith on our part in asking your thoughtful consideration of our new product.

Very truly yours,

CONNECTICUT TEL. & ELEC. CO., Inc.

E. C. Hilcox Prés.



When Writing to Advertisers, Please Mention Motor Age.

How Much Should an

Remember the Bicycle!

YOU probably recall the 60-lb. bicycles. *Everybody* made them heavy, and a "century run" was an event. Then a pioneer who was *thinking* cut off 28 lbs. in one stroke. Built bicycles that weighed 32 lbs. Other manufacturers *warned* the public. Said light weight bikes couldn't *stand up*, and would "jolt the rider all to pieces." Within two years *all bicycles* were *light weight*, *lower priced*, stronger, more durable, just as *smooth-riding* as ever, and century runs were *common-place* because of the *economy in power*. History is repeating itself.

An Automobile Should Weigh Less Than 3000 Pounds

When we say "Automobile" we mean the average type of car, the five-passenger touring car of 120-inch wheel base. That is the correct length of car for comfort. Less length is not enough. More is unnecessary.

Up to a year and a half ago all cars of this size—both four-cylinder and six-cylinder—weighed from four to five thousand pounds. Most of them still do. That's *two to two-and-one-half tons*.

Is such weight *reasonable*? Is it *necessary* for *safety* and *durability* and *comfort*?

Some manufacturers would ask you to *think so*, but can you imagine it?

Three or four years ago it *was* necessary,—not for safety or durability or comfort, but simply because no manufacturer *knew* how to build *lighter* cars and *build in* the required qualities.

The world moves. *Some* of the *people* stand still for a time, but the *world* goes on.

And with the rapid development of automobiles came a parallel *demand* for *lighter weight*, just as came the demand for six-cylinder *continuous*, *smooth* flow of power.

The public said: "We want cars. We know the pleasure of the automobile. We know its utility. But we are staggered by the expense. Tires wear out so fast and they cost so much! The motor eats up so much gasoline and it costs so much! Why can't *lighter* automobiles be built, with *just* as much safety, just as much durability, just as much comfort? Why not?"

Well, *why not*? A couple of years ago *some manufacturers* began to think seriously on that question. Among them were the men who built the first Chandler Light-Weight Six a year-and-a-half ago,—men who had been designing and building and selling the highest grade motor car in America for years. And for years before that, the finest bicycles.

We certainly knew motor car construction, we knew six-cylinder construction, we knew automobile engineering, we knew that the demand for light weight was logical, and we felt sure we could build a six-cylinder car of 120-inch wheel base that would possess every known degree of safety, of durability and of comfort and *not weigh more than 3000 pounds*.

How, you may ask, did we hope to cut off that fifteen hundred or two thousand pounds!

Someone suggests that light weight comes from cheap materials. Not at all. *Cheap iron* is just as heavy as good iron. We were going to *cut out the iron*.

And we cut it out.

IT'S THE PEOPLE WHO HAVEN'T CUT OUT THE IRON THAT ARE "WARNING" YOU AGAINST LIGHT WEIGHT.

We cut out the iron, the heavy forgings that add weight but *not* strength to a car. And what did we use in its stead? *Aluminum* and *pressed steel*. Are they as strong? Ask any engineer you chance to know.

It takes two men to lift a *cast iron* crank-case. But you can put an *aluminum* crank-case under your arm and walk away with it. Which would you rather have, the cast iron or the aluminum?

Another factor in Chandler light weight is the use of high grade, efficient, imported ball bearings throughout, in place of the heavy, friction-producing roller bearings with their heavy cases and carriers.

And so on, all through the car, we cut out *weight without* sacrificing one single degree of strength.

Is it *DURABLE*? Ask any Chandler owner. We will refer you to as many as you want, and in any part of the country you say. *Of course* the car is durable. We started with a *clean slate*—no errors to forget, no faults to overcome, and we built it so that it *had* to endure.

Is it *SAFE*? A year's service has brought no report of a *break-down*. Hundreds of owners have done five to ten thousand miles without a single repair. In the Swedish Reliability Test, conducted by the Swedish Royal Automobile Society in February—over 800 miles of storm-wrecked roads that experts declared impassable—the Chandler was the only American-built entrant with no failure to finish. And in all other endurance tests it has finished with honors. Do not these qualities spell safety? The Chandler gives you *100 per cent safety*.

Is it *COMFORTABLE*? We will let you answer that for yourself. The car will tell you all about comfort better than we can. Go to your Chandler dealer—there's one in every principal city in America and in hundreds of smaller cities.

Automobile Weigh?

Go to him and say, "Prove to me that a car weighing less than 3000 pounds is as comfortable as the heavy cars. Let me pick out the roads. Drive me where I want to go. Get away from the boulevards. Take me fifty miles out through the country and *drive fast*. Hit all the bumps. Let's see if it's comfortable."

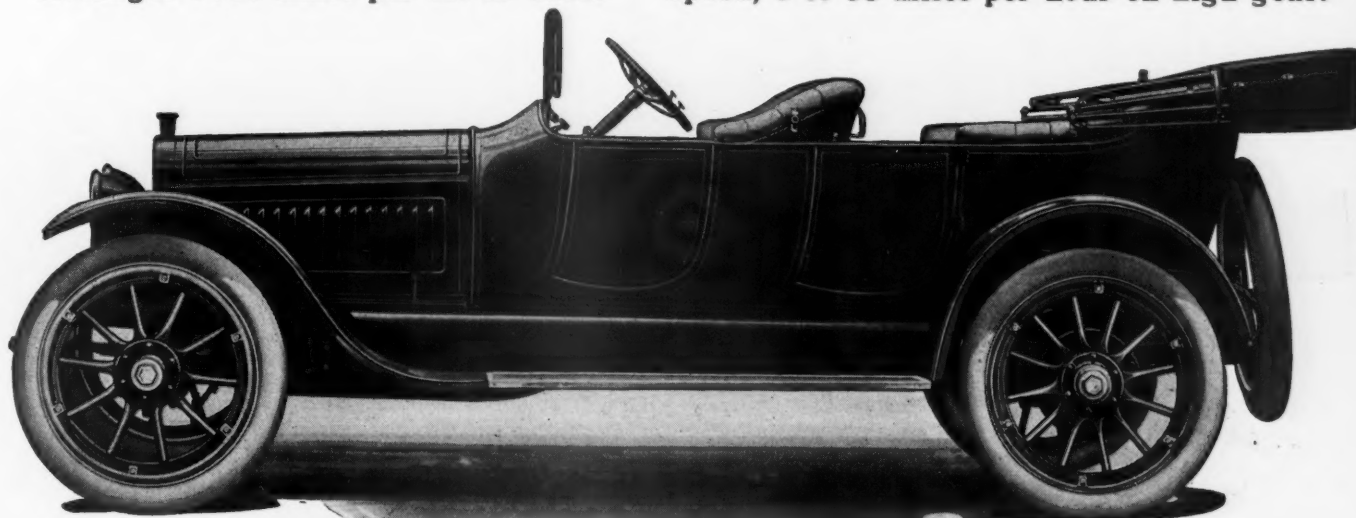
Put it up to the Chandler man just like that. Don't worry about hurting his feelings. He's *waiting* for you.

When you get all through *finding out all you can* about automobiles, you'll know our answer is *right*—that there is no reason in the world for a five-passenger automobile weighing more than 3000 pounds other than the failure of the manufacturer to move with the world!

CHANDLER LIGHT WEIGHT SIX \$1785

Weights 2885 pounds fully equipped.
Averages 7000 miles per set of tires.

Averages 16 miles per gallon of gasoline.
Speed, 3 to 55 miles per hour on high gear.



We believe this is the *finest* motor car selling for less than \$2500. The Chandler long-stroke motor is built with all the *precision* of a watch. It is quiet and powerful. Chandler features worthy of very special note are:

Cast aluminum base extending from frame to frame contains integral cast pedestals for magneto, generator and starting motor. Imported silent chains drive the cam shaft pump and generator. Westinghouse Separate Unit Starting and Lighting System. Simple single wire system for lighting. Wiring run through armored conduit. Bosch high-tension magneto, the most expensive form of ignition, which many builders of sixes are leaving out. Unit power plant completely enclosed. Self-contained oiling system. Multiple disc steel and raybestos ball-bearing clutch. F. & S. imported Annular ball bearings. Left-side drive, center control. Equipment includes Jiffy Curtains; New Haven 8-day clock; Jones Speedometer. Rain-vision, clear-vision, ventilating windshield; Firestone demountable detachable rims; motor driven horn, etc., etc.

Heavy Car Builders Do Not Name Weight

YOU have noticed, of course, that practically all manufacturers are *talking* now about lighter weight. But it's mostly just talk. Read the advertisements, "A light car and a speedy one," "How much should an automobile weigh," "The unmistakable demand for light weight," "Our car is 300 pounds lighter," "Our light six is just the right weight," and so on, and so on. A lot of fine sounding talk, but NO FIGURES. If they are proud of 3700 lb. weight or 4000 lbs. or 4500 lbs. why don't they *name* the weight!

And have you noticed that the *only* cars whose weights are *advertised* weigh less than 3000 lbs.? All the others will name their weights, too, when they reach the 3000 lb. mark, but *not* before.

Write today for Catalogue and a convincing little book called "Bouquets," wherein many men tell their experiences with the Chandler.

Chandler Motor Car Co., 205-235 E. 131st St., Cleveland, Ohio

METEOR 38—

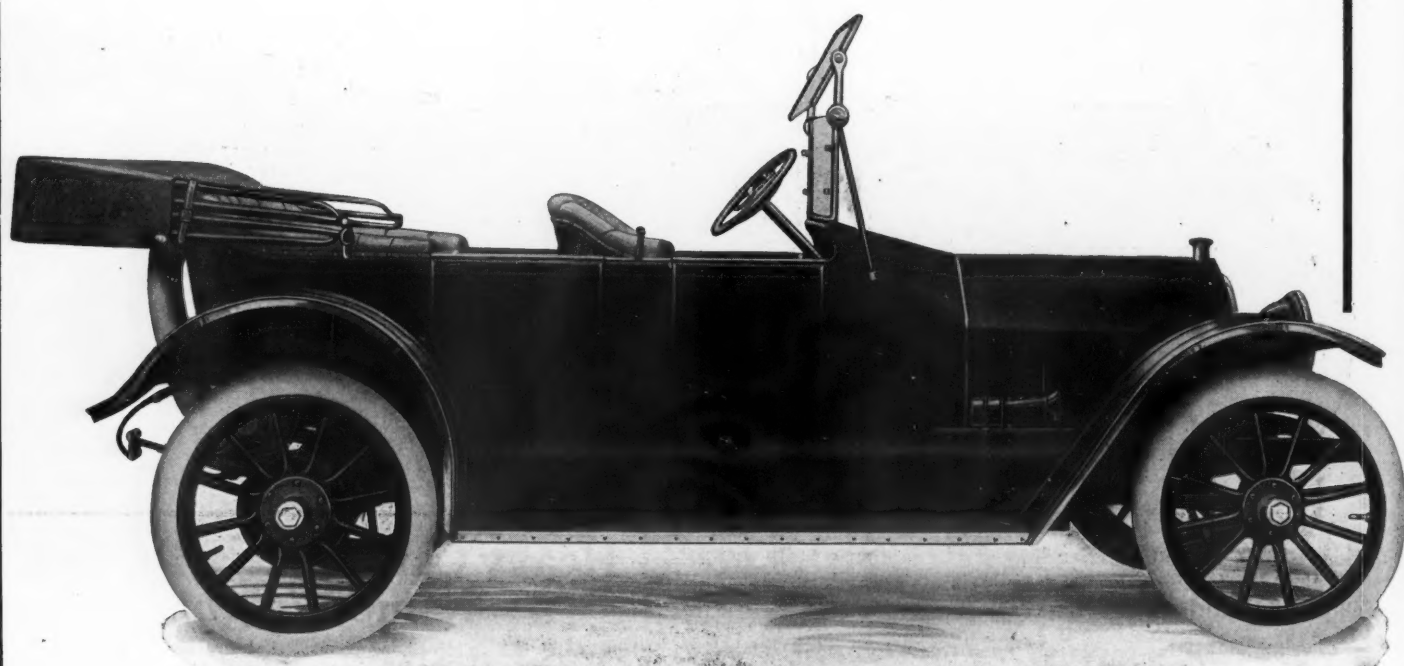
**Completely Equipped with Electric
Lighting and Starting System**

\$1050

32 H. P. $3\frac{3}{4}$ x5 Beaver Motor
Unit Power Plant
Multiple Disc Clutch
Floating Type Rear Axle
114 Inch Wheel Base
32x3 $\frac{1}{2}$ Inch Tires
Stromberg Carburetor
Genuine Honeycomb
Radiator

Left Side Drive
Center Control
All Black and Nickel Finish
Streamline Body
Long Stroke Motor
Cylinders in Pairs
Divided Crank Case
Perfect Oiling System

Completely Equipped with
Mohair Top and Boot
Clear Vision Windshield
Electric Starter
Electric Lights
Electric Horn
Speedometer
Jack, Tools, etc.

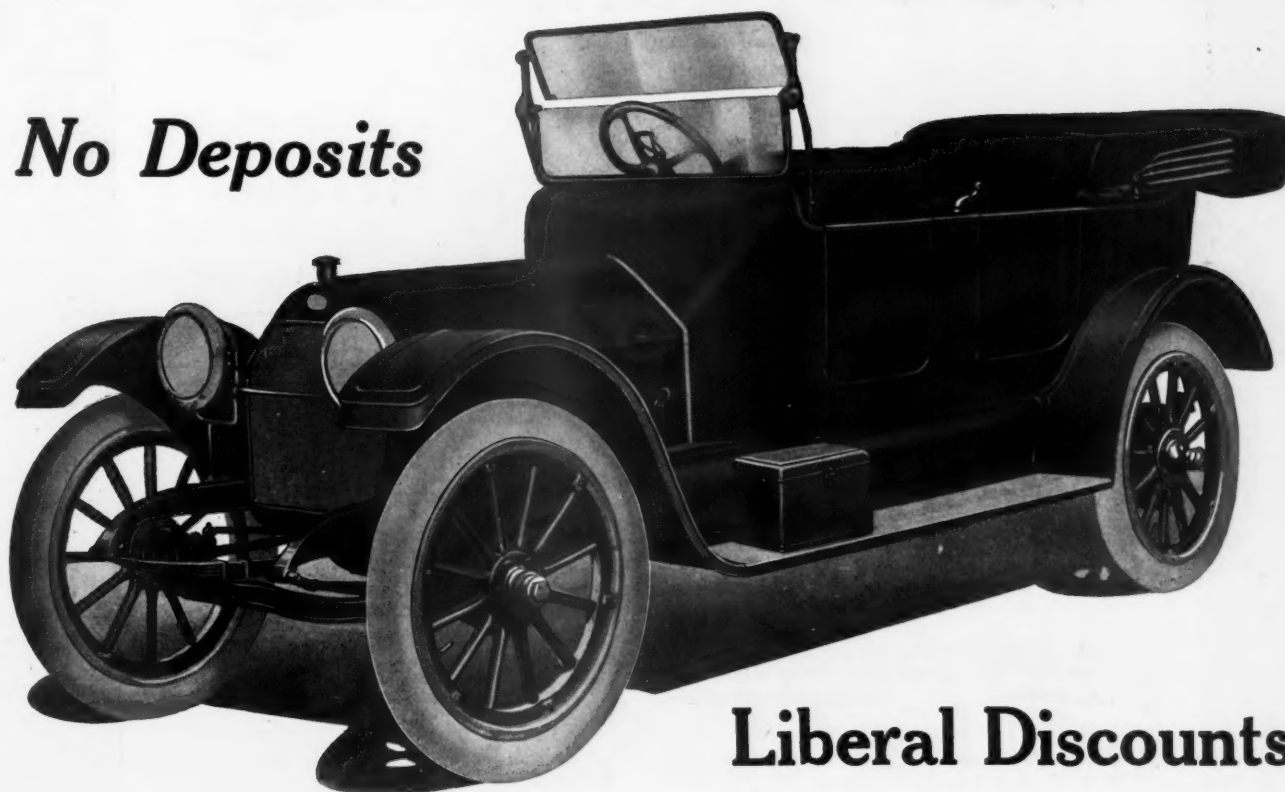


THE Meteor 38 has the wonderful $3\frac{3}{4}$ x5 Beaver Unit Power Plant. We have sold 300 cars the past year with this motor and have never supplied a repair part. It will develop full 32 H. P. and in this 2300 lb. car is a wonder on hills. This is a 1915 model, as it is just in production and will be run through the 1915 season. We are only one week behind on deliveries and in position to increase our output to take care of new dealers. This Model 38 is very classy in appearance and is beautifully finished with deep Turkish upholstery. It will meet any competition in the thousand dollar class.

METEOR 6-45—\$1395

Completely Equipped with Electric Lighting and Starting System

No Deposits



Liberal Discounts

OUR agency proposition is a liberal one. We do not take deposits on cars for future delivery. At this new list price of \$1395 this Six will sell to people who are buying fours. This is not a new, untried car, but has been on the market for a year and is thoroughly tested. We can make immediate deliveries. Write or wire for proposition on your territory.

Specifications

Motor—Beaver six cylinder L-head type, cylinder cast in pairs, $3\frac{3}{4}$ inch bore, 5 inch stroke, 45 H. P., enclosed valves.

Cooling—Genuine Cellular Honeycombed Radiator with large centrifugal pump.

Carburetor—Model B—3 Stromberg.

Ignition—Atwater-Kent timer and distributor and current supplied by generator. Wide range of spark advance. Impossible to short circuit battery.

Lubrication—Gear Pump forces oil from bottom of crank case direct to main bearings, overflowing into crank pits. Surplus oil returns to crank case to be used again.

Clutch—Multiple disc, Rabestos faced, dry or in oil.

Transmission—Selective Sliding-gear type, three speeds and reverse.

Control—Right hand drive, center control, foot accelerator.

Wheel Base—126 inches, makes a roomy, easy riding five passenger car.

Tires—35x4 Rough Tread. Goodrich.

Springs—Front semi-elliptic, rear three-fourths elliptic, 53 inches long.

Axles—Front drop forged, I-beam, rear floating type, no weight on axle shaft.

Brakes—All internal, acting on 14 inch drums.

Steering-Gear—Semi-irreversible, 18 inch steering wheel.

Color—Dark Blue.

Weight—3000 lbs.

METEOR MOTOR CAR CO., Piqua, Ohio

Ford Dealers!

Our special proposition
on the new Stewart Speedometer
for Ford Cars
will enable you to supply every
new Ford owner with a high-
grade Satisfactory Speedometer.
Telegraph our nearest
Branch office Today!

Stewart-Warner Speedometer Corporation

Executive Offices: 1931 Diversey Boulevard, Chicago

Factories: Chicago and Beloit, Wis.

Branches:

Atlanta, Ga., 399 Peachtree St.
Boston, Mass., 1111 Commonwealth Ave.
Buffalo, N. Y., 8-10 Brighton Ave.
Chicago, Ill., 1312 Michigan Ave.
Cleveland, Ohio, 1831 Euclid Ave.

Detroit, Mich., 1235 Woodward Ave.
Indianapolis, Ind., 514 N. Capitol Ave.
Kansas City, Mo., 1825 Grand Ave.
London, England.
Los Angeles, Cal., 115 East 10th St.
Minneapolis, Minn., 635 Third Ave., S.

New York, N. Y., 233 W. 58th St.
Paris, France.
Philadelphia, Pa., 608 N. Broad St.
Pittsburgh, Pa., 301 N. Craig St.
San Francisco, Cal., 1447 Van Ness Ave.
St. Louis, Mo., 3333 Olive St.

Service Stations in all cities and large towns

10,000 Miles Guarantee



Bricton Tires are backed by the strongest guarantee ever put behind a pneumatic tire

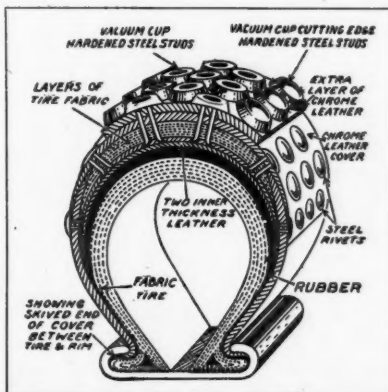
Never before have tire users been offered such assurance of continued service

Bricton Pneumatic Tires give you real Tire Economy

Bricton Pneumatic Tires are sold under a specific 10,000-mile written service guarantee, based on the results of six years' experience. They free you from the dangers of punctures, blow-outs and rim-cuts. Proof against oil, gasoline and ruts. Their wonderful resiliency contributes greatly to your comfort when you ride.

Your Tires Can Readily be Rebuilt the Bricton Way

If the fabric in the tires you are now using is in good condition, we can take them and make them proof against rim-cutting, punctures, blow-outs, side-wall breaks, skidding, ruts and oil. This will give you thousands of miles of added service.



Ten days' free trial offer. Try Bricton Tires at our risk

To remove any possible doubt regarding the merits of Bricton Tires, and to back up our statements fully, we will allow you to use these tires on your car for ten days at our risk. If you do not find them perfectly satisfactory in every way, return them to us at any time within ten days and we will refund the entire purchase price. Send your order today.

For full particulars mail back the coupon.

The Bricton Mfg. Co. 1254 Bricton Bldg.
Brookings, S. Dak.

BRANCHES

Boston, 182 Friend St., Dept. 1254.
New York, 250 W. 54th St., Dept. 1254.
Philadelphia, 611 Bulletin Bldg., Dept. 1254.
Detroit, 1036 Majestic Bldg., Dept. 1254.
Pittsburg, 1201 Hartje Bldg., Dept. 1254.
Chicago, 2009 S. Michigan Ave., Dept. 1254.
St. Louis, 3150 Locust St., Dept. 1254.
San Francisco, 909 Monadnock Bldg., Dept. 1254.

Mail Back This Coupon

**Bricton Mfg. Co.,
1254 Bricton Bldg., Brookings, S. D.**

Please send me full particulars about Bricton Tires, also explain how my own tires can be rebuilt the Bricton Way.

Size of Tires.....

Name

Address

Dealer's Name

When the history of Automobile progress of 1914 is written —this one great fact will stand out prominently—The advance made by Premier-Weidely engineering and construction was the greatest 6-cylinder motor car achievement of the year

Premier development is the result of the Premier policy—fortified by 12 years of constant, earnest and scientific analysis and study of the automobile—and the application of the knowledge gained by experience in building better, stronger, safer and more satisfactory motor cars.

We have worked upward, and forward—giving Premier owners the benefit of economies in production,—in lowered prices, in better factory standards—in new and improved mechanical achievements, and now with the application of the Weidely motor to the Premier car producing that great marvel of automobiles, the Premier-Weidely Six, we have reached the apex of 6-cylinder motor car engineering and construction development in the car that is offered you today.

The Premier-Weidely Six is a combination of every element that makes the best automobile. The silent, smooth, perfect-running Weidely engine has less moving parts—and greater power at the piston and at the wheel than is obtainable in any 6-cylinder poppet-valve motor of the same size, and with far less fuel consumption. **The frame** is scientifically designed to carry the weight, to resist the shock and stand the service requirements of the engine, the body and the weight of passengers to a degree that is only possible where exact knowledge of

mile for its power and carrying capacity—and reduces weight and wear on tires—that's the best car.

That's the Premier-Weidely Six

The Premier-Weidely is not built for men who just want a 6-cylinder car; rather do we address ourselves to men who, having owned ordinary machines and knowing their shortcomings, say: "We want a better car—a machine that will stand the stress and strain of our driving and at less expense." Men who have gone through the primary and secondary schools of automobile ownership and operation and with the knowledge born of experience say to the man who sells automobiles:

"We know the strength and weakness of the A—, B—and the C— automobile. We are not interested. Show us the best—the latest—the newest—the car of tomorrow, not the car of today."

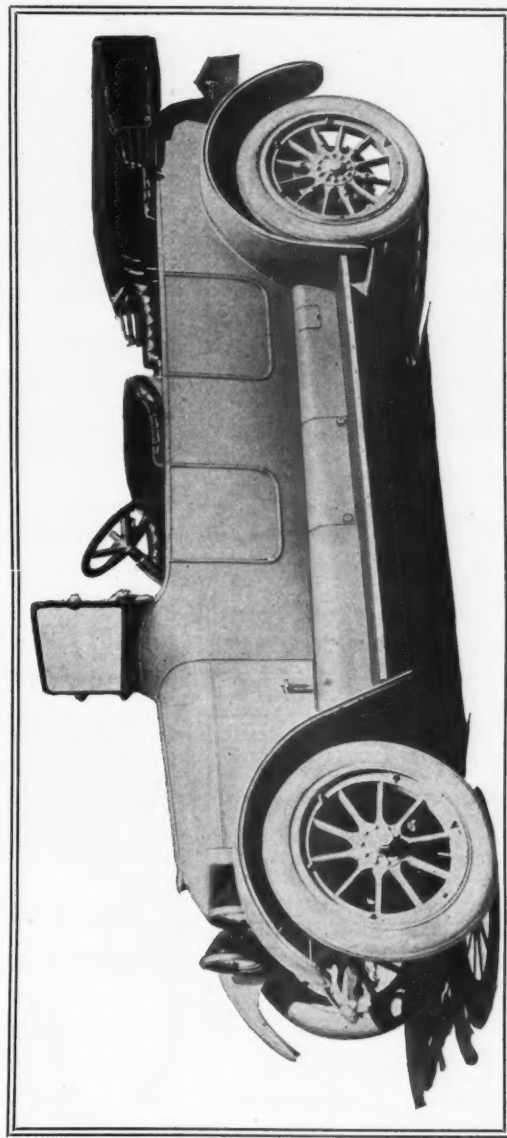
Those are the men, the keen buyers whom we are particularly anxious to meet, for we have that car of tomorrow. A great many of these men are buying Premier-Weidely Sixes. We want to know more of them and we think they want to know us—for the car we have to sell will stand their expert examination and demonstration. We know what it has done on our tests. We are glad to submit it to their tests, for no man who knows

the engine, the body and the weight of passengers to a degree that is only possible where exact knowledge of

service conditions has been applied after such tests as only Premier has withstood in the great endurance trials of the Glidden tours, ocean to ocean tours, etc.

The transmission, built for Premier and Premier alone—is powerful—reliable—exact in shape, size and proportion, wasting no energy—giving power to the complete needs of the car and with the maximum product of the engine and the minimum of friction.

The Premier policy is to build a car in which every



part, down to the last bolt and bearing, is in perfect proportion to the whole.

A perfect mechanical product is one in which every part fits and works in harmony. Too much weight in one place is as bad as too little in another.

The car that does the work—more smoothly—more easily—with less trouble to the driver—less expense to the owner—that is ready for service at any time and does the service at all times—that costs less to operate per

stration. We know what it has done on our tests. We are glad to submit it to their tests, for no man who knows

automobiles well goes very far in buying a motor car these days without trying it out to the limit.

The only mistake the possible purchaser may make is to consider the price of the Premier-Weidely Six too low. We will admit that by all standards of automobile excellence the price is low, but in our idea of efficiency in automobile construction and distribution we decided to forget the man who judges value by price alone. There are such men—but they are not the Premier-Weidely kind.

\$2700 at the Factory

We could ask more and get it—but we will not.

In towns where there is no Premier agency—there is a great opportunity for one strong—live—dealer to become the representative of this corporation—the opportunity is so good that we know many good men will ask us for further details.

Will you?

Premier Motor Mfg. Co., Indianapolis, Ind.



The Wetter the Better

IT'S the wet or grease of the slippery pavement that seals the strong, elastic Vacuum Cups and forms the never-slipping suction grip.

On the slippery slant to the curb—in a hundred close situations where a skid means collision—there's *positive safety* in

PENNSYLVANIA Oilproof VACUUM CUP TIRES

Guaranteed not to skid on wet or greasy pavements, else returnable at full purchase price after reasonable trial period.

The same massive cups that hold the slippery surface and thrust deep to good traction on soft roads, also give the greatest *extra* wear of any tread. 4,500 actual miles guaranteed, with average service always nearer twice that distance.

And then—the absolutely oilproof quality—the greatest tire saver known—does away with the only disadvantage of traveling oiled roads.

*For complete safety and maximum service
equip with V. C. Tires—dealers everywhere*

Pennsylvania Rubber Company
JEANNETTE, PA.



New York Boston
Chicago Pittsburgh
Cleveland San Francisco
Seattle

Los Angeles Minneapolis
Detroit Omaha
St. Paul Kansas City, Mo.
Dallas Atlanta



An Independent Company with an independent selling policy

We are asking dealers to anticipate their requirements all they can on

PENNSYLVANIA Oilproof VACUUM CUP TIRES

We provided for a further big rise in this year's demand but orders are already running ahead of our greatly increased production.

We are going right ahead expanding our facilities still more.

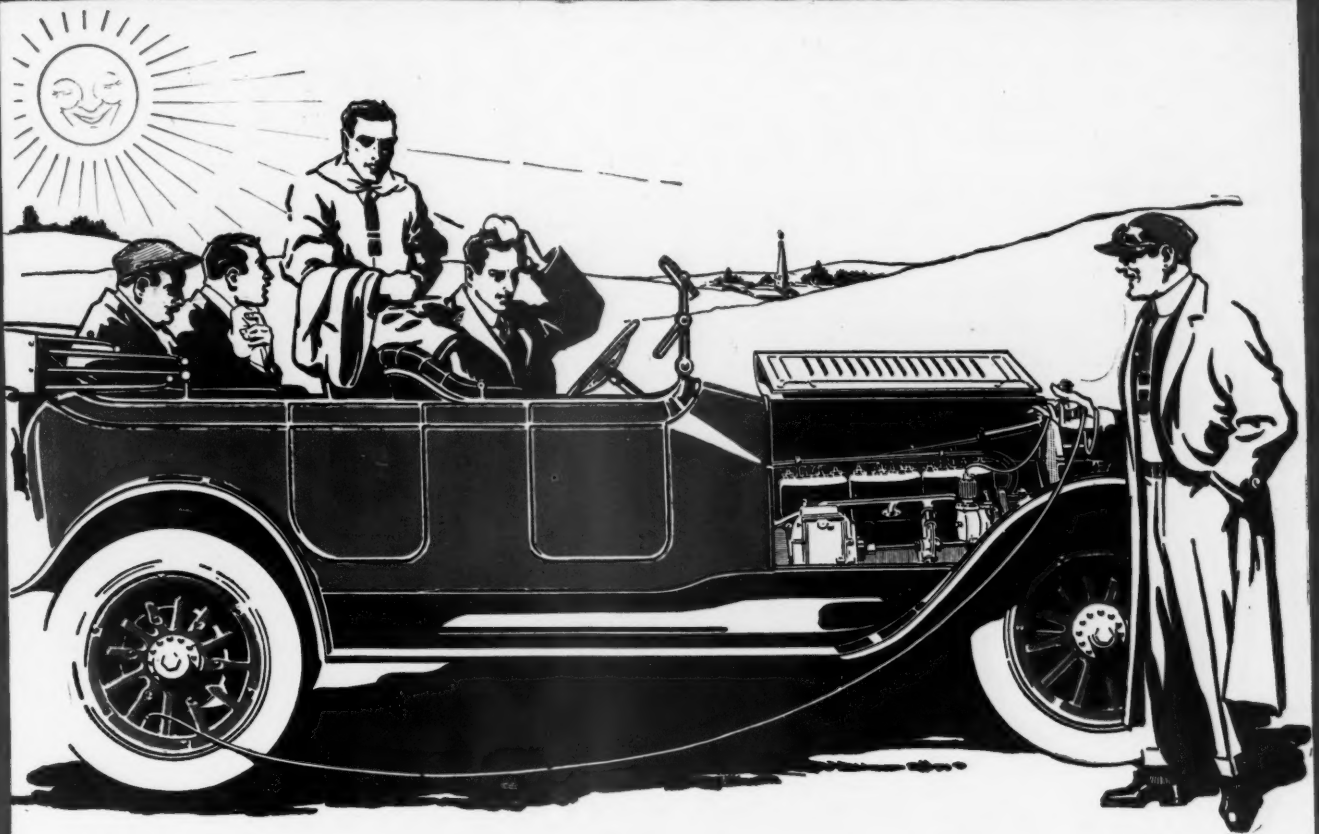
In the meanwhile, orders from dealers, a little further ahead of their requirements than usual, will be greatly appreciated and will result in timely service.

Pennsylvania Rubber Co. Jeannette, Pa.

New York	St. Paul
Chicago	Minneapolis
Cleveland	Omaha
Boston	Kansas City, Mo.
Pittsburgh	Seattle
San Francisco	Dallas
Los Angeles	Atlanta
Detroit	

*An Independent Company with
an Independent Selling Policy*

Typical advertisement of the Vacuum Cup campaign running in the Saturday Evening Post and all the prominent weeklies and monthly magazines.



The Demand for the Stewart Tire Pump is almost Universal

IT was hard to crank a motor by hand—so the electric starter was supplied by the car manufacturer and welcomed by the car owner. It was inconvenient to get out and light lamps—hence the joy with which electric lighting was received. Car producers have done much to make their output complete.

But they have entirely overlooked the *most* important thing,—for, the hardest job of all is to pump a tire by hand. Besides, the hand pumped tire is *never* correctly inflated. The motorist is still up against the back-breaking job of hand-pumping, and the expense, delays and troubles inflicted by tires that are not sufficiently blown up.

Now, however, the automobile manufacturers are figuring on the Stewart Tire Pump as regular equipment.

The car buyers are demanding it. They realize that it will not only save much labor and expense, but that it will also do away with the necessity of carrying extra demountable rims and tires. They know that it will to a large extent eliminate the tire trouble problem.

The Stewart is the most efficient, finely finished, dependable tire pump made. The piston is steel; the connecting rod hardened steel; the cylinder beautifully finished, having fins for perfect air cooling. The piston is oiled by rubbing against a wick, upon which oil is dropped from the outside. It is the only piston pump that absolutely prevents oil from getting into tires. It has no leather or rubber packings to wear out and cause leakage. The base is aluminum. The price, with air pressure gauge and 13 feet of high grade hose, complete, is only

\$15

See that the Stewart Tire Pump is regular equipment on the car you buy.

Stewart-Warner Speedometer Corporation

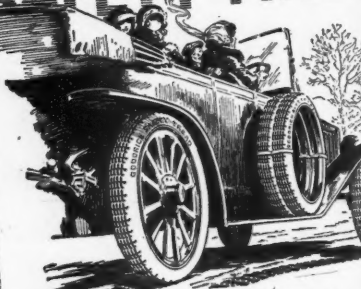
Executive Offices: 1967 Diversey Boulevard, Chicago

Factories: Chicago and Beloit, Wis.

17 Branches. Service Stations in all cities and large towns.



SAFETY FIRST



When "SHE" Drive
There isn't anything you're not going to make motoring safe for her and the kiddies to you'd be mighty extravagant in order to see First for them. Goodrich takes care of it. But you don't have to be. Goodrich puts the safety in the construction of the tire itself. And with all that you have and resilience and service in it. And with all that you have and anti-slip sureness in

Goodrich Safety Tread

SAFETY FIRST

in Goodrich Tires is as Fundamental as Their Quality

Safety must go deeper than the tread. Safety First has to be much more than an emergency proposition.

Safety must be made into the tire. Goodrich Tires are built on a foundation of Safety and their entire construction is based on Safety First Principles.

Nothing but the finest fabric and the best rubber could help to make such tires as Goodrich Tires.

The distinctive Goodrich Unit Molding method calls for the highest type of expert tire-making knowledge.

Goodrich Unit Molding makes the whole tire one piece. The thick, tough Goodrich rubber tread, the fabric, the layers of rubber, the side walls, beads and all are converted into one structure.

The tough, live rubber goes through and through the tire—there are no layer separations. That is one reason why Goodrich treads do not strip or peel.

And now the Goodrich Safety Tread gives the motorist security against skidding or sliding.

More than that, it gives him control and confidence. It makes the brakes effective and it backs up his steering gear under all conditions of road and weather, in ordinary driving and in emergencies.

Here are the prices on the best tires ever produced

Goodrich Safety Tread

Best in the



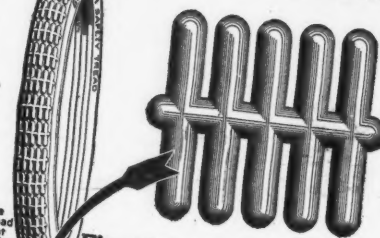
The Goodrich Safety Tread

Just the unit molding method and the Goodrich Safety Tread

No odd prices. The structure integrates itself.

Don't expect to equip at Goodrich.

SAFETY FIRST



Five Bars and a Cross Tie— the Safety First Symbol

Five thick, tough Goodrich rubber fingers— They dig down through mud, slush and ooze; they clean and grip the road. They stop the skid before it starts. They give you lower-cost mileage because of the extra thickness of rubber at the point of contact.

Goodrich Safety Tread Tires

Best in the Long Run—Best in the Short Stop

Don't experiment. Don't take chances. Look for the five bars and the cross tie in your choice of a non-skid tire. Read the reduced prices below. Retain them for your reference.

Goodrich Tires put "Safety First" on the map of motordom

The Goodrich Safety Tread—five bars and a crosstie, is the "Safety First Symbol." With its non-skid, non-slip features it gives longer mileage because of the extra thickness of tough Goodrich rubber at the point of contact with the road.

But the real reason back of the safety tread is Goodrich quality. "Safety First" has always been the fundamental principle of Goodrich tire-making—Goodrich unit molding, Goodrich rubber, Goodrich fabric and Goodrich knowledge keep Safety First in

Goodrich Safety Tread Tires

Best in the Long Run

The advertisements reproduced here-with are a few from the Goodrich "Safety First" campaign.

They have appeared in the national weeklies, magazines, leading news-

papers and farm papers. If you have given these advertisements occasional notice you must realize that only the accepted standard tires could back up such publicity.



Factories:
Akron, Ohio

The B. F. Goodrich Company

Branches in All
Principal Cities



There is nothing in Goodrich Advertising that isn't in Goodrich Goods

This shows how Goodrich Safety Tread Tires

Best in the Long Run

Let down the actual proof of their ability to grip the roadway and turn the corners without danger of skidding or slipping—this means the Safety First tread for motorcars.

Don't pay more than prices named here for the accepted standard non-skid tread.

Size	Goodrich Safety Tread	Standard
30 x 3	\$11.70	\$12.00
30 x 3 1/2	15.75	17.00
32 x 3 1/2	18.75	20.00
32 x 4	22.50	25.00
34 x 4	33.00	35.00
34 x 4 1/2	34.00	36.00
36 x 4 1/2	37.10	38.00
36 x 4 3/4	44.45	46.00
38 x 4 3/4	47.50	49.00

needs is "Safety First"

You can't afford to take chances—can't afford to experiment. Get Safety First—on slippery streets—around dangerous corners—through crowded traffic—over country roads and treacherous main pavements. You get Safety First by equipping your car with

Goodrich Safety Tread Tire

Best in the Long Run—Best in the Short Stop

The thick, tough rubber fingers clean a road, cut and slash—grip the roadway and hold your car to its course. Under the Safety Tread is the Goodrich Unit Molding—Safety First—made in one piece that means lower cost per mile.

The following are the prices on the best practical standard tires made. You should know. Your dealer will gladly sell you Goodrich Safety Tread Tires at these prices:

30 x 3	\$11.84	34 x 4	\$37.00	37 x 4	\$47.50
30 x 3 1/2	15.88	34 x 4 1/2	38.00	37 x 4 1/2	48.00
32 x 3 1/2	18.92	36 x 4 1/2	41.00	39 x 4 1/2	51.00
32 x 4	22.96	36 x 4 3/4	44.00	39 x 4 3/4	54.00
34 x 4	33.40	38 x 4 3/4	47.00	41 x 4 3/4	57.00

(Local Branch Address)

Factories:
Akron, Ohio

Branches in All
Principal Cities

The B. F. Goodrich Company

all our forty-four years of manufacturing experience our motto has been "Progress and Efficiency."

Longer service and more satisfaction to tire user has been our watchword.

We have not only been pioneers in perfecting and devising the best means to put mileage and quality into rubber and fabric, but we have been the pioneers in bringing tire prices to their present low level and raising the standard of quality.

With us it has been a history of better raw materials, improved methods—higher quality and lower prices.

Today Goodrich leads in quality. We set the standard by which all other tires are judged.

All this in addition to the pleasing sense of security which you have when you equip your car with Goodrich Safety Tread Tires.

Here are the prices on the best tires ever produced in the Goodrich factory:

Size	Goodrich Safety Tread	Standard
30 x 3	\$11.70	\$12.00
30 x 3 1/2	15.75	17.00
32 x 3 1/2	18.75	20.00
32 x 4	22.50	25.00
34 x 4	33.00	35.00
34 x 4 1/2	34.00	36.00
36 x 4 1/2	37.10	38.00
36 x 4 3/4	44.45	46.00
38 x 4 3/4	47.50	49.00

(Local Branch Address)

The B. F. Goodrich Company

Factories: Akron, Ohio

Branches in All Principal Cities

There is nothing in Goodrich Advertising that isn't in Goodrich Goods

Goodrich Safety Tread Tires

Best in the Long Run



The Goodrich Safety Tread Five Bars and a Crosstie The "Safety First" Symbol

The quality of Goodrich Tires today is the standard by which all other high grade tires are judged. That is because they represent perfection of tire making and tire knowledge—which gives Goodrich Tires leadership.

Just the unit-molding of bars and crosstie which 1-2-3-4 and balance the strain on a smooth tread and gives more actual service and mileage.

A Message On "Safety First"

The good tire user, direct from the factory, First in fund construction.

The accept When a tire is standard there is that. The Good one by who must be judged. Five bars and a First symbol—look for. The rubber fingers dig solid road, through slush. They make them and they are with

There is nothing in Goodrich Advertising that isn't in Goodrich Goods

Safety must go deeper than the tread. Goodrich Tires are built on a foundation of the finest rubber and the most efficient workmanship.

Goodrich Safety Tread
Best in the Long Run

SAFETY FIRST

Quality, Service and Lower Cost Mileage
Goodrich Tire Users

Goodrich Unit Molding is really the original "Safety First" idea in tire construction.

Safety must go deeper than the tread.

It must be made into the tire. Goodrich Tires are built on a foundation of safety.

The quality of Goodrich Tires today is the standard by which all high grade tires must be judged. This is because they represent the perfection of tire-making and tire-knowledge—which gives Goodrich Tires their leadership.

The body of the tire, side walls, fabric, rubber, bead and tread are balanced and interlocked through and through so that the whole tire is one unit.

The user of Goodrich Tires gets the utmost in service and mileage, because each tire wears as a unit—every part of the tire helping every other part to perform the service demanded of it. This is one of the reasons why Goodrich Tires give better service and lower cost mileage.

And now the Goodrich Safety Tread solves the skidding and sliding problem for the motorist and gives him "Safety First" in actual operation as well as in construction.

Don't experiment any more. Save your money and your life.

Goodrich Safety Tread
Best in the Long Run



The strong rubber clean and grip the road and make your

No odd projections to

Just the unit which braces the tire so that smooth tread service and

SAFETY FIRST

Goodrich Unit Molding was the original Safety First tire idea

The quality of Goodrich Tires today is the standard by which all high grade tires must be judged. This is because they represent the perfection of tire-making and tire-knowledge—which gives Goodrich Tires their leadership.

Every layer of the finest fabric, the liveliest, best rubber—the whole tire—tread, side strips, bead and all—becomes one piece in Goodrich Unit Molding—the original Safety First idea in tire building.

All this backs up the Goodrich Safety Tread—the group of bars and the cross-in-the-circle that form the Safety First symbol for the motorist.

Take no unnecessary chances. Equip at least the rear wheels with

Goodrich Safety Tread Tires
Best in the Long Run

Here are the lowest prices on Goodrich Tires. Tread that only the best can match.

We have never made better tires than Goodrich Tires are today

Yet the tire user buys them for lower prices than he ever before paid for such high-grade tires.

The quality of Goodrich Tires is the standard by which all other high-grade tires are judged.

Goodrich Safety Tread Tires

Best in the Long Run

Lower cost, longer mileage, better service and Safety First—all for you in Goodrich Tires.

Your dealer can supply you, or can get them from the nearest Goodrich branch.

Here are the prices to pay for the best tires ever produced in the Goodrich factory:

Size	Smooth Tread Prices	Safety Tread Prices	Grey Inner Tube Prices	Size	Smooth Tread Prices	Safety Tread Prices	Grey Inner Tube Prices
30 x 3	\$11.70	\$12.65	\$2.80	34 x 4 1/2	\$33.00	\$35.00	\$6.15
30 x 3 1/2	15.75	17.00	3.50	35 x 4 1/2	34.00	36.05	6.30
32 x 3 1/2	16.75	18.10	3.70	36 x 4 1/2	35.00	37.10	6.45
33 x 4	23.55	25.25	4.75	37 x 5	41.95	44.45	7.70
34 x 4	24.35	26.05	4.90	38 x 5 1/2	54.00	57.30	8.35

Dealers almost everywhere have Goodrich Tires in stock or can get them for you from one of our branches or depots

Factories: **The B. F. Goodrich Company** Akron, Ohio
Branches in All Principal Cities

There is nothing in Goodrich Advertising that isn't in Goodrich Goods

"Sa

Safety must go deeper than the tread. It has to be made into the tire itself. It has to be quality—just as you will bank on certain men in emergencies because you know the quality in them. Goodrich Tires are quality through and through. Goodrich Unit Molding—the original Safety First idea in tire making—which wears as a unit—every part produces a tire which wears as a unit—every other part to render the service demanded of it. Don't experiment. Insure Safety First for your car. Equip at least the rear wheels with

Goodrich Safety Tread Tires
Best in the Long Run



Goodrich puts forty-four years of experience and quality in rubber manufacturing in every Goodrich Tire.

That puts the safety in the construction of the tire in—puts strength and resilience and service in it.

Goodrich Unit Molding Tires are the standard by which all other high grade tires are judged because of their wonderful wearing quality and uniform excellence. That's why Goodrich has held the leadership for nearly 50 years.

The extra thickness of tough Goodrich rubber in the trends at the point of contact with the road provides longer wear, longer service and longer satisfaction.

The Goodrich Safety Tread—five bars and a cross, the Safety First Symbol—has no odd projections to dig into the tire and thus break and disintegrate the inner layers.

The groups of bars and cross-like prevent severe or undue strain on any one point. Safety trends are the only non-skid tire that ride just as easily and smoothly as the smooth tread. They distribute the bumps, jolts and jags, acting in unison with the inside of the tire. Their arrangement stops the skid before it starts and prevents sliding or slipping forward.

Here are the prices on the best tires ever produced in the

Size	Smooth Tread Prices	Safety Tread Prices	Grey Inner Tube Prices	Size	Smooth Tread Prices	Safety Tread Prices	Grey Inner Tube Prices
30 x 3	\$11.70	\$12.65	\$2.80	34 x 4 1/2	\$33.00	\$35.00	\$6.15
30 x 3 1/2	15.75	17.00	3.50	35 x 4 1/2	34.00	36.05	6.30
32 x 3 1/2	16.75	18.10	3.70	36 x 4 1/2	35.00	37.10	6.45
33 x 4	23.55	25.25	4.75	37 x 5	41.95	44.45	7.70
34 x 4	24.35	26.05	4.90	38 x 5 1/2	54.00	57.30	8.35

Goodrich Safety Tread Tires
Best in the Long Run



The Goodrich Safety Tread—five bars and a cross, the Safety First Symbol—has no odd projections to dig into the tire and thus break and disintegrate the inner layers.

Besides all that, mileage, because of her and the fabric, the workmanship and the

Insure Safety First for your car. Equip at least the rear wheels with

Here are the prices on the best tires ever produced in the

Size	Smooth Tread Prices	Safety Tread Prices	Grey Inner Tube Prices	Size	Smooth Tread Prices	Safety Tread Prices	Grey Inner Tube Prices
30 x 3	\$11.70	\$12.65	\$2.80	34 x 4 1/2	\$33.00	\$35.00	\$6.15
30 x 3 1/2	15.75	17.00	3.50	35 x 4 1/2	34.00	36.05	6.30
32 x 3 1/2	16.75	18.10	3.70	36 x 4 1/2	35.00	37.10	6.45
33 x 4	23.55	25.25	4.75	37 x 5	41.95	44.45	7.70
34 x 4	24.35	26.05	4.90	38 x 5 1/2	54.00	57.30	8.35

(Local Branch Address)

Factories: **The B. F. Goodrich Company** Akron, Ohio

There is nothing in Goodrich Advertising that isn't in Goodrich Goods

The Goodrich Safety Tread



Five Bars and a Cross—the "Safety First" Symbol—has no odd projections to dig into the tire and thus break and disintegrate the inner layers.

Besides all that, mileage, because of her and the fabric, the workmanship and the

Insure Safety First for your car. Equip at least the rear wheels with

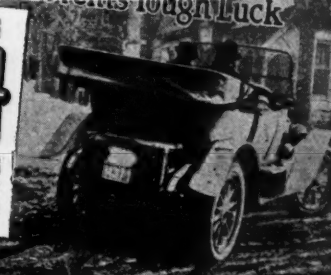
Here are the prices on the best tires ever produced in the

Size	Smooth Tread Prices	Safety Tread Prices	Grey Inner Tube Prices	Size	Smooth Tread Prices	Safety Tread Prices	Grey Inner Tube Prices
30 x 3	\$11.70	\$12.65	\$2.80	34 x 4 1/2	\$33.00	\$35.00	\$6.15
30 x 3 1/2	15.75	17.00	3.50	35 x 4 1/2	34.00	36.05	6.30
32 x 3 1/2	16.75	18.10	3.70	36 x 4 1/2	35.00	37.10	6.45
33 x 4	23.55	25.25	4.75	37 x 5	41.95	44.45	7.70
34 x 4	24.35	26.05	4.90	38 x 5 1/2	54.00	57.30	8.35

(Local Branch Address)

Factories: **The B. F. Goodrich Company** Akron, Ohio

There is nothing in Goodrich Advertising that isn't in Goodrich Goods



This picture from a photograph shows how the Goodrich Safety Tread Tires on the rear wheels overcame the skid of the smooth tires on the front wheels.

Goodrich Safety Tread Tires
Best in the Long Run

The thick, tough Goodrich rubber fingers of the Safety Tread dig down and grip the road. They stop the skid. They make the brake effective and steering sure. Goodrich quality in the tire backs up the Goodrich Safety Tread.

Here are the prices to pay for the best tires ever produced in the Goodrich factory:

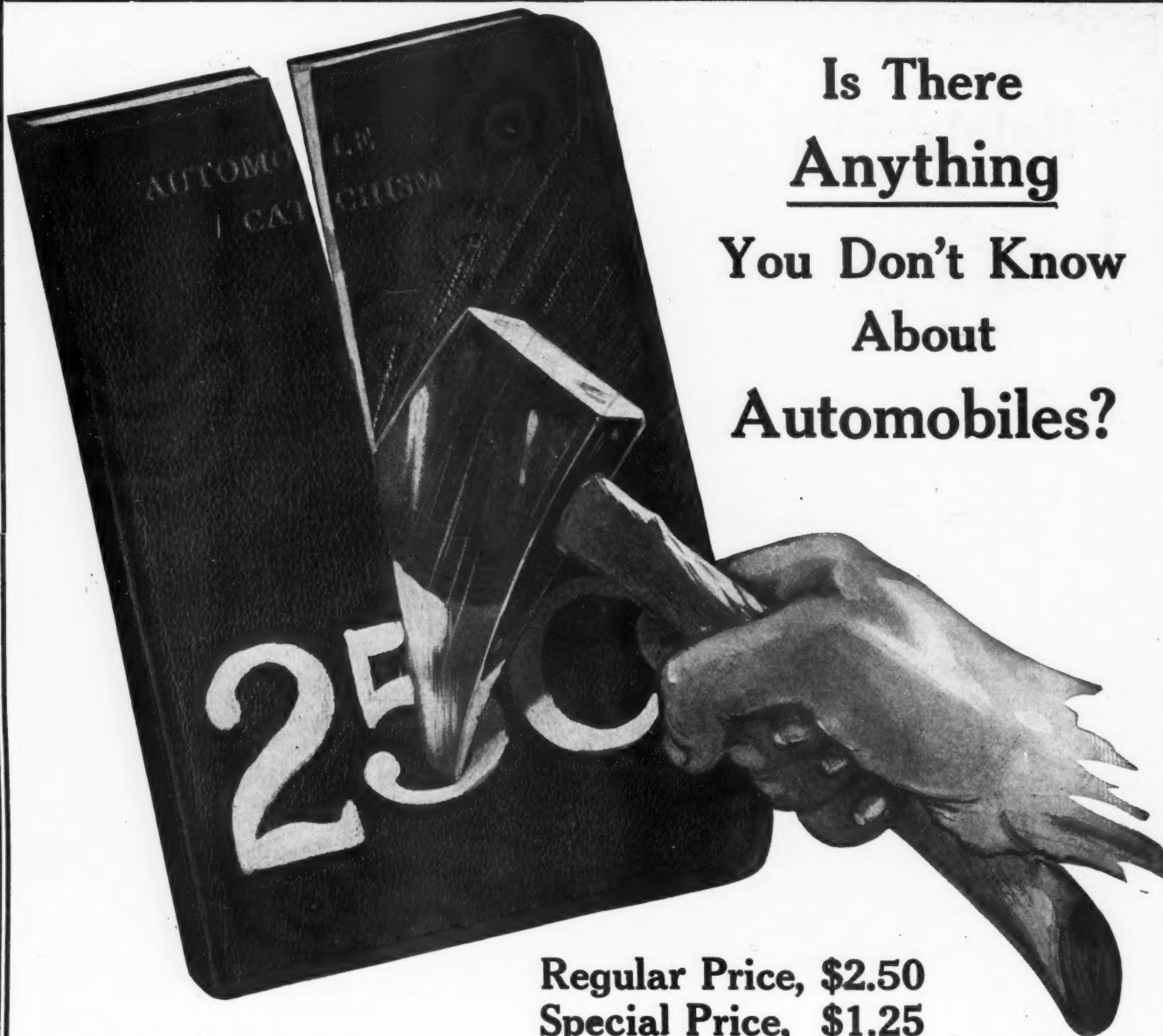
Size	Smooth Tread Prices	Safety Tread Prices	Grey Inner Tube Prices	Size	Smooth Tread Prices	Safety Tread Prices	Grey Inner Tube Prices
30 x 3	\$11.70	\$12.65	\$2.80	34 x 4 1/2	\$33.00	\$35.00	\$6.15
30 x 3 1/2	15.75	17.00	3.50	35 x 4 1/2	34.00	36.05	6.30
32 x 3 1/2	16.75	18.10	3.70	36 x 4 1/2	35.00	37.10	6.45
33 x 4	23.55	25.25	4.75	37 x 5	41.95	44.45	7.70
34 x 4	24.35	26.05	4.90	38 x 5 1/2	54.00	57.30	8.35

(Local Branch Address)

Factories: **The B. F. Goodrich Company** Akron, Ohio

There is nothing in Goodrich Advertising that isn't in Goodrich Goods

Is There
Anything
You Don't Know
About
Automobiles?



Regular Price, \$2.50
Special Price, \$1.25

THE AUTOMOBILE CATECHISM" (de luxe edition) is a complete course in automobile instruction—every subject discussed and illustrated so that YOU will grasp every point worth while—every bit of mystery is made as simple as A B C. You are interested—you are instructed—you are directly benefited. Its information is final.

It's a handsome piece of book work—splendidly printed, with 101 illustrations; flexible black leather binding, rounded corners and gold-edged pages—beautiful, while being intensely practical.

THE
CLASS
JOURNAL
COMPANY

900 S. Michigan
Ave., Chicago, Ill.
231 W. 39th St.,
New York, N. Y.

Gentlemen:
Enclosed please find \$1.25,
for which send me a copy of
"The Automobile Catechism"
(de luxe edition).

Name.....
Address.....

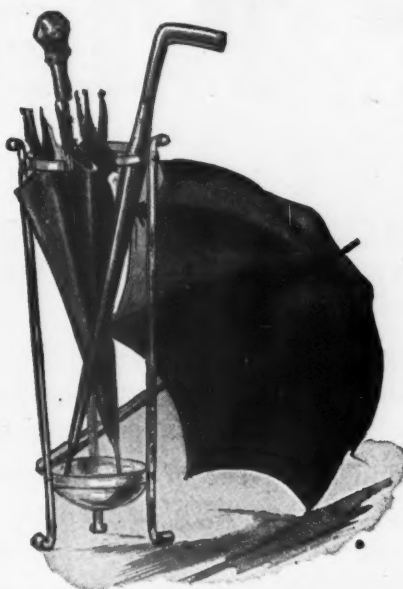
It will be to your immediate financial advantage to acquire an intimate and practical knowledge of cars and their parts. Lack of knowledge is expensive.

We want every reader of Motor Age to have a de luxe copy of "The Automobile Catechism." To make our offer irresistible we have decided, **FOR A LIMITED TIME ONLY, to CUT THE PRICE IN TWO.** This half price (\$1.25) will prove the best investment you ever made. Remember, this is the de luxe edition—264 pages—every page full of real, money-interest value.

Put your name and address on the corner coupon, tear from the page, enclose \$1.25 and mail today to—

THE CLASS JOURNAL COMPANY
900 S. Michigan Avenue Chicago, Ill.
231 W. 39th St. New York, N. Y.

(2)



Who Ever Heard of a Rubber Umbrella?

THE functions of an umbrella and an automobile top are almost identical. The purpose of each is the same, yet there is no such thing as a rubber umbrella. Is there any good reason why there should be rubber in an automobile top cloth, except as mentioned in our previous announcements that such cloths have been make-shifts pending the advent of a perfect automobile top cloth.

An umbrella is made of one piece, single thickness cloth, free from all chemical compositions, yet it affords complete protection.

Laidlaw Burbank Motor Cloth is one solid piece of cloth free from rubber or artificial leather compounds. There is nothing in Bur-

bank to dry out, crack, decompose, peel, blister or rub off. These weaknesses do and always will exist in rubber interlined or artificial leather surface-coated cloths.

An umbrella is an extremely practical article which opens conveniently and folds compactly, and a good one will give excellent service for years. All because there is nothing chemical about it to be affected by heat or cold or long continued folding.



Laidlaw Burbank Motor Cloth possesses every one of the features and characteristics of a perfect top material, and retains them under the most severe and trying conditions, for a period of time longer than the life of the car.

The Laidlaw Company, Inc.

126-132 West 46th Street

New York, N. Y.

Your Markets

THE AUTOMOBILE TRADE DIRECTORY'S MAILING LIST embraces the entire purchasing power of every phase of the automobile and motor truck industries.

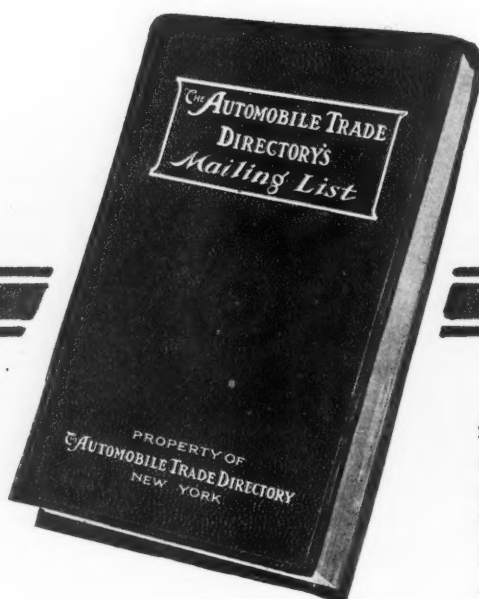
It contains the names and addresses of all Automobile, Commercial Vehicle, Cycle Car and Motor Manufacturers, together with the names of their Engineers, Purchasing Agents, Superintendents and other officials.

It also gives names and addresses of all Dealers, or Agents for Automobiles and Motor Trucks, together with names of cars and trucks handled. Also the names and addresses of all Garages, Repair Shops, Charging Stations and of the Dealers and Jobbers of Supplies.

The Automobile Business is still subject to constant changes and tremendous growth, both in its manufacturing and selling branches.

The AUTOMOBILE TRADE DIRECTORY, INC., spends upwards of \$40,000 a year in maintaining the integrity of its listing—just as much in eliminating the deadwood of the trade as in keeping up-to-date.

Every name given is a live and legitimate concern or business man, conducting a business exactly as listed. To keep pace with changes both in the



This list adapts itself to the requirements of every manufacturer in the business.

With a copy of it at your command, you can get into direct communication with the individuals who recommend, specify and buy the parts, materials and equipment entering into the manufacture of all cars and trucks; you can circularize the "Ford" dealers or the agents

for any other particular make of car or truck. You can "follow-up" a town, a city, a state, the United States or the whole North American Continent and—you can rest assured that your mail matter—all of it—

is addressed to only live and legitimate concerns. THE AUTOMOBILE TRADE DIRECTORY'S MAILING LIST gives sufficient data about the

The Automobile Trade Directory

When Writing to Advertisers, Please Mention Motor Age.

You either buy or sell. As a buyer you need THE AUTOMOBILE TRADE DIRECTORY and as a seller you need to advertise in it. As a seller you cannot afford to be without THE AUTOMOBILE TRADE DIRECTORY'S MAILING LIST. Write us for full particulars.

[illegible]

jobbers and dealers listed so that you do not shoot in the dark and wait for general results.

In the first section manufacturers are listed by states and towns. Names and initials of the officials in con-

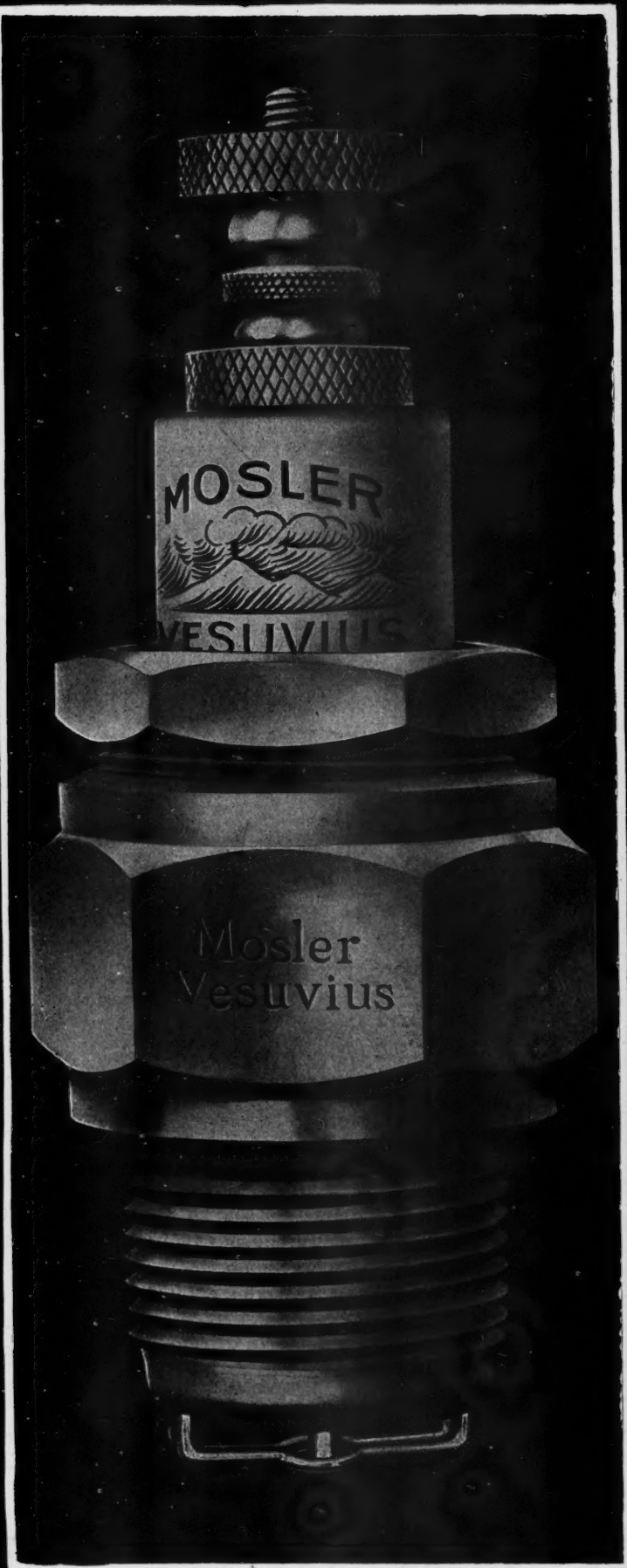
SECOND SECTION

trol of the policy, engineering and purchasing plans of each concern are given.

In the second section we not only list the name of every active concern or individual in the trade, but have also arranged them by states, counties and towns—the towns is given in each case—as cars or trucks each dealer handles.

ry 39-243 W. 39th St., New York

When Writing to Advertisers, Please Mention Motor Age.



180-R

Mosler Vesl

are made with German Steatite insulator or porcelain. They are as nearly indestructible as a plug can be made.

No other plug is as well protected and insured against leaks.

Indest Gas Tight

These are the essentials of Mosler Vesuvius Plugs. write for

A.R. MOSLER
NEW YORK

Survivius Plugs

nan
ce-
arly
plug

well
red

Powerful because of permanent adjustment of electrodes.

Only one way to assemble—that way insures correct adjustment. Ears on collar fit in slots of shell preventing insulator from turning and insuring proper assembly.

Constructible at Powerful

s of
gs.
for

Spark Plug construction found only in
Send for particulars, prices. Dealers
discounts.

SLER & CO.
N.Y.



Cannot be assembled in
any but the right way.

EISEMANN

The Eisemann Magneto Company is now prepared to furnish a complete high grade magneto outfit for Ford cars, ready to attach with the minimum amount of labor, at the retail price of \$50 for the single ignition set and \$55 for the dual ignition set.

This price includes everything necessary to do away with the trembler coil system of ignition as supplied on your Ford at present and to supply your car with the finest Eisemann Magneto Ignition system it is possible to produce.

In producing this outfit care has been taken to build only the finest product possible for the Eisemann factory to produce rather than a cheap makeshift for a low priced car. All the quality that the name Eisemann implies is found in this outfit from the magneto itself down to the castings specially designed to make the system readily interchangeable.

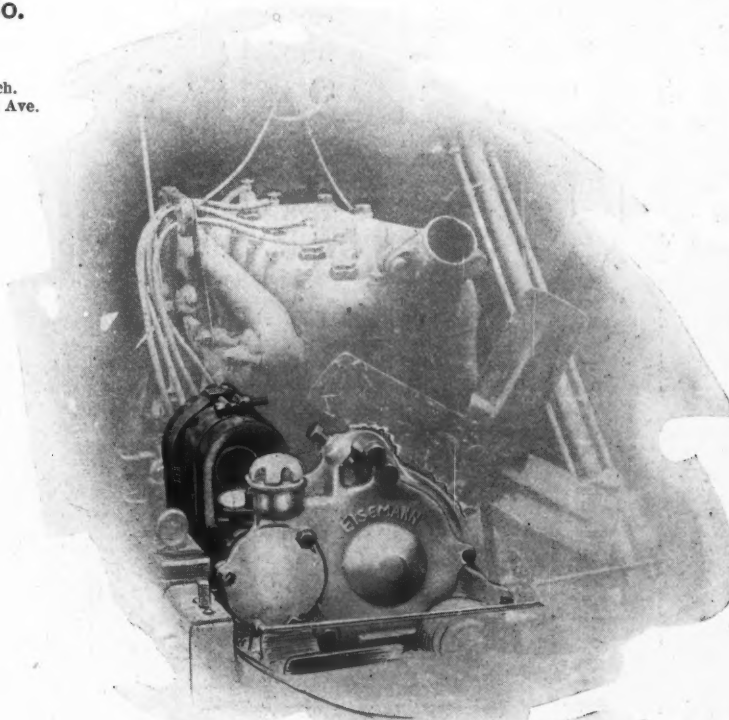
If you cannot get all the data you desire concerning this new outfit from your dealer write to us direct.

Announcing a High
Quality Magneto
Outfit for Ford Cars

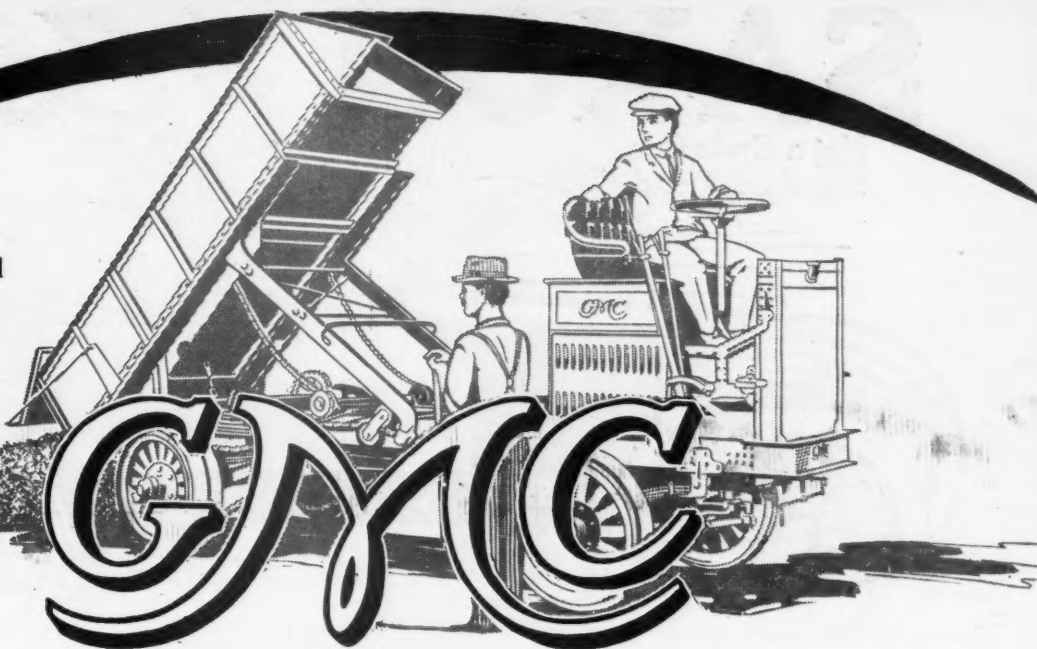
The Eisemann Magneto Co.

Sales and General Offices
32-33d St., Brooklyn, N. Y.

New York	Indianapolis, Ind.	Detroit, Mich.
23 W. 52d St.	514 N. Capitol Ave.	802 Woodward Ave.



5 Ton Gasoline Model
Automatic Dump
Price, Chassis Only
\$ 2750



GENERAL MOTORS COMPANY TRUCKS

Above all else **GMC** Trucks are *high grade*. They are built *right* from the ground up, *right* from the standpoint of the metallurgist and the engineer and *right* in the opinion of practical men who concern themselves only with actual results.

Hard headed, practical men have been the biggest buyers of **GMC** Trucks. They demand *reliable* truck performance at a *reasonable* cost. They get what they want in **GMC** Trucks. First, because **GMC** Trucks are well built. Second, because they can select a

GMC gasoline or electric truck that fits their work exactly.

Third—They can buy the truck they choose at a price based on big production and low overhead expense — a price that represents *actual value*.

GASOLINE From 1¼ ton at \$1500
to 5 ton at \$3000
(Chassis)

ELECTRIC From 1000 lbs. at \$1200
to 12000 lbs. at \$2500
(Chassis Less Battery)

As pioneers in the motor truck industry we have naturally learned much of value to prospective installers of commercial vehicles. All this experience is at *your* disposal.

Either communicate with our nearest factory branch or write us direct.

GENERAL MOTORS TRUCK COMPANY

One of the Units of the General Motors Company
Pontiac Michigan

Branches:—New York, Boston, Chicago, Philadelphia,
Kansas City, Detroit, St. Louis

SAXON \$395

Not a Cycle Car
Standard Tread



Price of \$395 Includes Top, Windshield, Lamps and Tools

135 Miles a Day for 30 Days

Our claim is that the Saxon stands up as well as high priced cars.

And here's the evidence that justifies this claim.

A Saxon car has just finished a run of 135 miles a day for 30 consecutive days—a test held under official observation in Detroit—a performance that makes Saxon endurance and Saxon economy established facts.

For 30 days—through an April snow flurry, a hail storm and frequent rains, this sturdy car adhered to its schedule; it conquered hills, plowed through mud, and fairly skimmed over rough roads.

The Saxon that made this test was a standard car. It did just what any other Saxon car can do. For, everywhere the nation over, Saxon cars are making good under all road and weather conditions.

Saxon a Car of Wonderful Economy

30 miles to the gallon of gasoline; 250 miles to the quart of oil—these were the records made by the Saxon. Half a cent a mile for fuel; a quarter of a cent per mile per passenger. This Saxon proved that

it is the most economical car in the world—to buy and to run.

Every tire still looks good for from 3000 to 5000 miles more. Not a single tire was replaced—after this run of 4050 miles. Every tire appears as if it had just entered service instead of having run a distance that means the life of many tires.

What does this 135-mile-a-day run mean to you? It gives you the desired information about how the Saxon you buy now will stand up a year from now. It indicates that in buying the Saxon you get a car of dependability and economy.

The Saxon that made this run went through the test without a repair or replacement. The motor ran always as sweetly and smoothly as the day it started. The springs showed great flexibility; the transmission and axles developed remarkable smoothness.

Facts About Saxon Quality

The reasons for Saxon quality are evident when you consider these facts:

Motor of Saxon design and Continental manufacture—powerful, smooth, silent and economical.

Sliding Gear Transmission—the only correct type to use.

Springs of Vanadium Steel—flexible and unbreakable. Cantilever type of suspension same as in high priced English and French cars.

Finest Materials—No automobile built employs better materials in the axles, frame and transmission.

Tested Car—Every Saxon thoroughly tested in the Saxon factory and the completed car given far reaching road tests.

Don't delay in getting in your order for your Saxon. See the nearest Saxon dealer—name on request. Take a Saxon ride—and the car will immediately win you.

To Dealers—Although dealer's territory is nearly all allotted, yours may still be open. Write or wire for information and literature.

Saxon Features

Not a Cyclecar.
4-Cylinder Continental Motor, water-cooled.
Standard Tread.
96-Inch Wheelbase.
Left Drive, Center Control, enter from either side.
15 Horsepower.
Sliding Gear Transmission.
More leg room than high-priced cars.
Streamline Body.
Honeycomb Radiator.
Dry Plate Clutch.
Light Weight.
Wire Wheels.
Good Looks.
Low Upkeep.

Saxon Motor Company, Detroit

Address Dept. M

When Writing to Advertisers, Please Mention Motor Age.

This Tag Tells a Story



It is the visible badge of cars equipped with "Jiffy" curtains.

It appears on the right, rear curtain of the automobile top. And it tells the car purchaser instantly that the manufacturer is giving him the very best article in top-curtain equipment. Not a makeshift — not a substitute — but the genuine recognized best "Jiffy" curtains.

Jiffy curtains cost more and everybody knows it, just as they know "Sterling" costs more than plated ware.

These 33 makers willingly pay the extra cost to give their customers extra service

Abbott-Detroit
Chandler-Six
Franklin
Hupmobile
Howard-Six
Hudson
Haynes
Keeton
Knox
Krit
Lewis
Lexington
Locomobile
Lozier
Luverne
Maxwell
Mitchell
Monarch
Oakland
Oldsmobile
Palmer-Singer
Packard
Paige
Peerless
Pierce-Arrow
Pilot
Regal
Studebaker
Speedwell
Stevens-Duryea
White
Winton
Willys-Knight

Their judgment is sane. The advantages of Jiffy curtains are so overwhelmingly important—so vital from the standpoints of protection, comfort, convenience and safety.

Jiffy advantages require no lengthy explanations. Every car purchaser sees them instantly.

He sees curtains that give more light—and give full view.

Curtains that when not in use are out of sight—but always instantly within reach. He appreciates what it means to raise or lower curtains in sixty seconds.

He appreciates that the celluloid lights cannot crack because, instead of being rolled, they are folded flat.

He sees the advantage of curtains in reach but not in the way—always complete and always there. No searching or hunting for them and no mislaying them or leaving them home.

He instantly comprehends how they

slide back and forth on a japped cable and are as easy to operate as opening and closing a door.

And he does not have to be told why top makers everywhere are replacing old style equipment with Jiffy curtains.

He looks for them on the car he is considering. The cars so equipped speak for themselves.

Indeed many owners go to the length of insisting that a car cannot be up-to-date unless it is "Jiffyquipt."

Like the streamline body and certain other fundamental features in modern design, they recognize Jiffy curtains as expressive of the modern ideas in automobile top curtains. It is not too much to say that they measure the policy of the maker by his willingness to adopt the one practical, successful improvement in top curtain making.

That's why it's much easier to sell "Jiffyquipt" cars than to explain.

Jiffy Auto Curtain Company

Detroit,

Michigan



HIGH *and* LOW TENSION MAGNETOS



MASTER VIBRATORS ROAD SMOOTHERS AUTO LOCKS

Rough Riding on Rough Roads



That enviable pleasure of comfortable motoring—regardless of how rough the roads, or how fast you drive—is yours, made possible by



Road Smoother

Name Copyrighted

Quickly Applied to Your Ford Car

They take the roughness out of the road and eliminate the pitching, swaying and vibration that racks and shortens the life of your car. K-W Road Smoothers seem to level off the high places and fill up the low places. Wherever you ride the bumps and jolts are gone—**ironed out** by the K-W Road Smoothers. They give you **big, heavy car comfort**, combined with **light-weight car advantages**. They save tire and gasoline bills and add greatly to your safety and the life of your car.

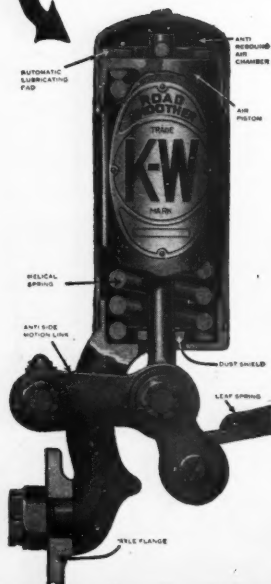
The "anti-rebound air chamber" prevents the rebound of the spring. It is an essential feature and found **only** in the K-W Road Smoothers.

The "anti-side-motion links" of the K-W Road Smoothers prevent side rocking and swaying when turning corners, and greatly reduce any tendency to skid.

There are no wearing parts or friction surfaces, consequently no oiling or packing in grease is necessary. No attention required after installation.

K-W Quality Throughout

K-W Road Smoothers are built of the very best materials obtainable. We use no cheap castings, but instead, high-grade, heat-treated drop forgings. Our springs are made of electric smelted chrome, Vanadium steel—the most expensive spring steel that money will buy. They will not bend—they will not break—they will not lose their easy riding qualities because K-W quality is built into them all the way through.



\$25 Set of Four
One For Each Wheel

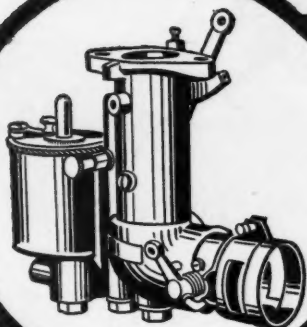
The principle is right—the design is right—the workmanship is right—and the price is right.

K-W Road Smoothers are sold by reliable dealers everywhere. If your dealer cannot supply you, we will send a set direct to you on receipt of price. Don't confuse these with ordinary shock absorbers. Write for free booklet—"Taking out the Bumps." We will gladly send it on request.

HEADLIGHTING OUTFITS

THE **K-W** IGNITION CO.
2835 CHESTER AVE. CLEVELAND, OHIO, U.S.A.

SPARK COILS SPARK PLUGS



PASSÉ

The Air Valve Carburetor Has Been Proven Unreliable

The passing of the carburetor built with moving parts is surely under way. With its valves and springs and cams to give shifting mixtures and wear, it is being repudiated by those who realize its limitations—a constantly growing class.

The President of a competing carburetor company has recently made a sworn affidavit in which he refers to the air valve type as follows:

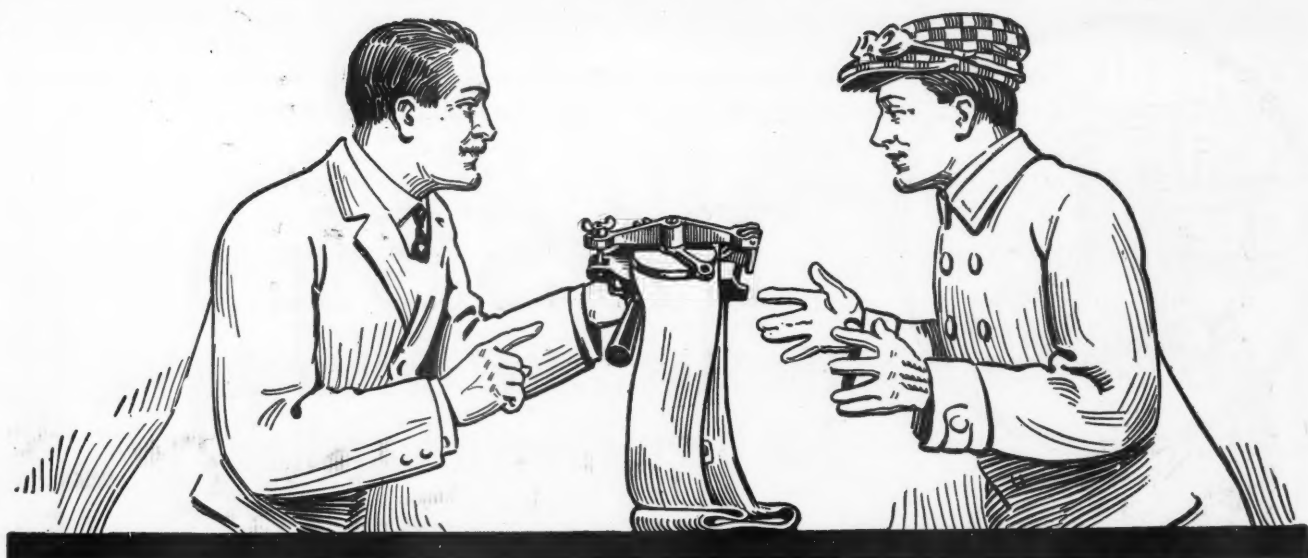
"The objection to this form of device, that it has moving parts which are liable to get out of order and also that it is expensive to make, led to the investigation of means for securing the desired leanness of mixture at higher speeds by a device operating without moving parts, and the engineers of this company gave much study and made experiments with this end in view."

The Zenith with its Compound Nozzle has remained unchanged in principle for the seven years of its existence. Why not equip your cars with a standardized product?

ZENITH CARBURETOR CO.
DETROIT, MICHIGAN.



When Writing to Advertisers, Please Mention Motor Age.



Keep Your Tires in Good Condition with a **SHALER** Vulcanizer

You can repair any puncture, blow-out, tear or hole in any casing or inner tube—anywhere—in a few moments with a Shaler Vulcanizer. It vulcanizes thoroughly and makes the repair the strongest part of the tire. Every Shaler has automatic heat control which makes it impossible to overcure or undercure the tire. The Shaler does not need to be watched. It works automatically. Simply clamp the Shaler Vulcanizer on your tire and it does the rest. A boy can operate it.

The Shaler is the Standard Vulcanizer used by the best garages and repair shops everywhere. We make the only complete line of vulcanizers, from the small vulcanizer for motorists' use at home to complete Garage Equipment. We are the largest manufacturers of vulcanizers in the world and our complete line includes vulcanizers of every type—Electric—Gasoline—Alcohol and Steam for every requirement.

Shaler Safety Vul-Kit \$3.50 The Safety Vul-Kit is designed to meet the motorist's requirement for an inexpensive outfit that can be carried in the tool box for emergency repairs to tubes and casings. It mends tube punctures and small casing cuts as perfectly and permanently as the most elaborate outfit. Absolutely safe. Burns gasoline or alcohol—an exclusive Shaler feature. Avoids all flame, smoke and danger—can be turned upside down while in operation without spilling a drop of fuel. No watching, no regulating; simply fill the cut or puncture with new rubber, clamp on the vulcanizer—fill and light the generator. The fuel supply is limited to that required for perfect vulcanization. You can't overcure or undercure a repair. Tubes are clamped against the vulcanizing surface by a swivelled plate inlaid with asbestos to retain the heat and prevent pinching the tube. You can't accidentally spoil a repair or tube by clamping one side of the plate tighter than the other. Handle always cool, permits removing vulcanizer from tire as soon as repair is finished. Anybody can use it. Furnished complete with repair material—everything but the fuel. Fully nicked—will last a lifetime. **Type G 32 Shaler Safety Vul-Kit, \$3.50.**

Shaler Model "D" For Motorists—\$12.50

Operates from city lighting current. When ordering, state voltage of current and whether it is direct or alternating. The Model "D" is a safe, clean vulcanizer for the motorists own use at home. Any motorist or chauffeur can mend tubes and casings perfectly with it. The exact vulcanizing temperature is maintained by a thermostat which automatically makes and breaks the circuit—giving automatic heat control. There is no possibility of overcuring or undercuring the tire. No watching or regulating necessary. Easily attached to any electric light socket. It vulcanizes two tubes as quickly as one. Repairs Blow-Outs, Cuts, Tears, Punctures, etc. A 3½ by 7 inch repair can be made at one setting, and larger repairs by resetting. Heats in a few minutes and costs but one-half cent an hour to operate. Furnished with ten feet of conducting cord, U. S. Gov't tested heat gauge, Para Rubber, cement, and illustrated book of instructions. Finished in polished nickel. Price complete outfit, \$12.50.

Model D-81-\$12.50



Send for our Free Book "Care and Repair of Tires"

This handy little book is brimful of practical information about automobile tires. It tells what to do for every kind of tire trouble—how to treble your tire mileage—how to get the most service out of your tires, and how to vulcanize and repair your own tires at home. The leading American and Foreign automobile publications quote "Care and Repair of Tires" as authority. We will gladly send a copy on request to any motorist, free of charge and without obligation.

C. A. SHALER COMPANY, 219 Fourth Street, Waupun, Wisconsin
Canadian Distributors, John Millen & Son, Limited, Toronto, Winnipeg, Montreal, Vancouver, Victoria



The Maxwell "25" is a powerful automobile—a real, full-grown automobile—a handsome stream-line automobile, and it looks and acts like an automobile of three times the price.

The Maxwell "25" has absolutely every essential quality, and absolutely every necessary feature found in the very highest priced cars.

In actual economy of operation, in real ability to keep out of the repair shop, it not only equals, but surpasses most cars which cost five times its price.

The Maxwell "25" weighs 1885 pounds. A wonderful "tire economy car." Has 30x3½-in. tires. FRONT and REAR, permitting rear tires to be shifted to front wheels to give extra long service.

The motor is cast en bloc; 3¼-in. bore; 4¼-in. stroke; adjustable valves completely inclosed. Extra large crank shaft; bearings of bronze with babbitt lining.

Motor water cooled, will not overheat.

More Power for Its Weight Than All Higher Priced Cars

The Maxwell "25" has a real 25 horsepower motor—which develops more power in proportion to the weight of the car than the engines of most \$5,000 automobiles.

The Maxwell "25" can pass most any car on hills "in high."—It is a phenomenal hill climber.

Costly High Tension Magneto—Like Highest Priced Cars

The Maxwell "25" has a Simms high-tension magneto, which always delivers the spark direct to the spark plugs in correct time. This means no coils—NO MAKE-SHIFT MASTER VIBRATORS—no mechanism that requires frequent delicate adjustments. The magneto works right, and stays right.

Transmission—4 Speed Selective Sliding Gear, Center Control

The Maxwell "25" has a 4 speed selective type

transmission, 3 speeds forward and 1 reverse. The main shaft has HYATT ROLLER BEARINGS at front end—bronze bushing babbitt lined at rear. Adjustable cone clutch is lined with motobestos. It takes hold firmly without sudden gripping, and without undue noise.

Control—Brakes of Extra Strength

The Maxwell "25" has left-side, 16-inch steering wheel. There is plenty of room for a big man to drive without being cramped. Spark and throttle control rods are inclosed in steering column. There is a foot throttle or accelerator pedal with foot rest. Transmission Control Lever is in CENTER OF CAR and is OPERATED BY THE RIGHT HAND.

The SERVICE BRAKE IS CONTRACTING and the EMERGENCY BRAKE EXPANDING. They act on 12½-inch brake drums bolted to rear wheels.

Unfailing, Economical, Springless Atomizer Type Carburetor

The Maxwell "25" has a Zephyr Carburetor—Atomizer Type. This gives unusual high mileage per gallon of gasoline without constant carburetor trouble. Starts and runs right in any weather, and controlled from the dash.

Lubrication—Improved Splash System With Oil Saving Pump

The Maxwell "25" has splash lubrication with a sturdy, slow-moving plunger pump. This saves oil.

Capacity—A Real 5-Passenger Car of Comfort

The Maxwell "25" is a real 5-passenger car. It carries 5 grown people comfortably. There is plenty of leg room.

Phenomenal Easy Riding Qualities

The Maxwell "25" has 4 SEMI-ELLIPTIC TYPE SPRINGS. The front springs are 32 inches long. The rear springs are 40 inches long, fixed at front, shackled at rear, and mounted on a rocking seat. ABSOLUTELY NO EXPENSIVE SHOCK ABSORBERS OR AUXILIARY SPRINGS ARE NEEDED.

Fullest Equipment—Complete and of Unusual Quality

The Maxwell "25" has a perfectly fitted top with envelope. The top has the famous "Jiffy Curtains," which fold back in the top and can be let down in an instant without getting out of car.

Full equipment of handsome lamps, Prest-O-Lite tank, full set of tools, jack, pump, Stewart speedometer, etc. A strong, good-looking tire carrier comes on the back of the car.

You have no extras to buy. Everything comes with the car.

See the Maxwell dealer in your town at once, and look at this wonderful, complete car. IF THERE IS NO MAXWELL DEALER NEAR YOU, WRITE FOR INTERESTING, ILLUSTRATED, DESCRIPTIVE CATALOGUE.

Address Dept. E

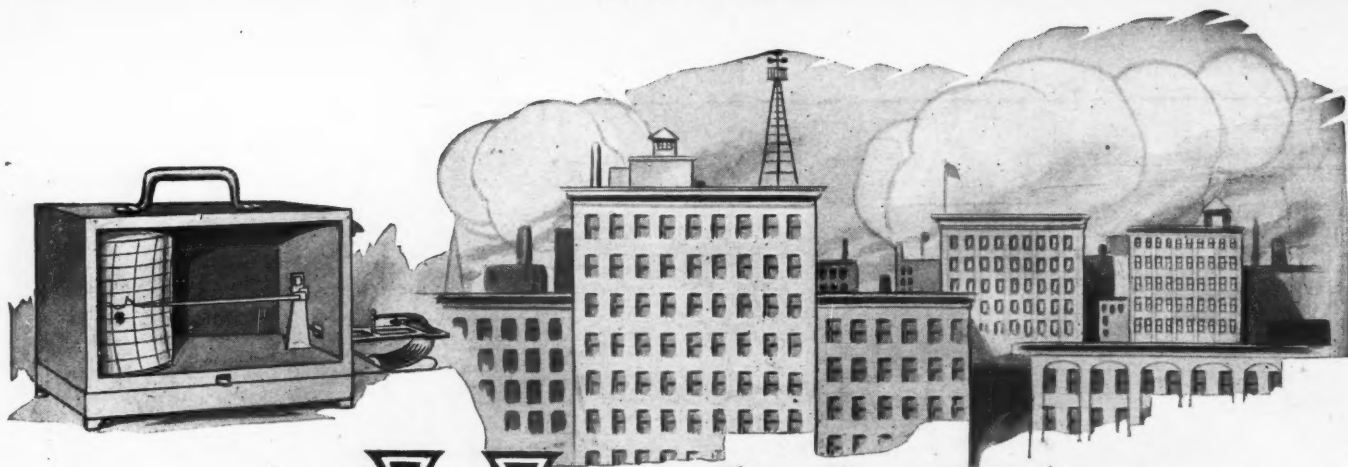
Maxwell Motor Co., Inc.

Detroit, Michigan

FULL \$ EQUIPMENT

DEALERS: This is a sample of our great national advertising campaign on the Maxwell "25"

When Writing to Advertisers, Please Mention Motor Age.



United States Government weather bureaus use, for continuous recording of temperature, an instrument called a thermograph.

The records are made by a spring which, by its contraction and expansion, moves a metal arm at the end of which is a recording pen.

The fidelity with which it notes even the smallest changes in temperature firmly establishes the fact that springs are greatly affected by slightest changes in temperature, and are therefore unreliable when used for purposes where such variation is undesirable and certain to result in inaccuracy.

For want of something better, springs have been used in carburetors.

For years carburetors were made with springs from necessity—nothing could be found to take their place.

In the new self-adjusting Holley, however, all springs, balls and cams and other inaccurate methods of control have been entirely eliminated.

Only those natural laws of gravity and air pressure are utilized.

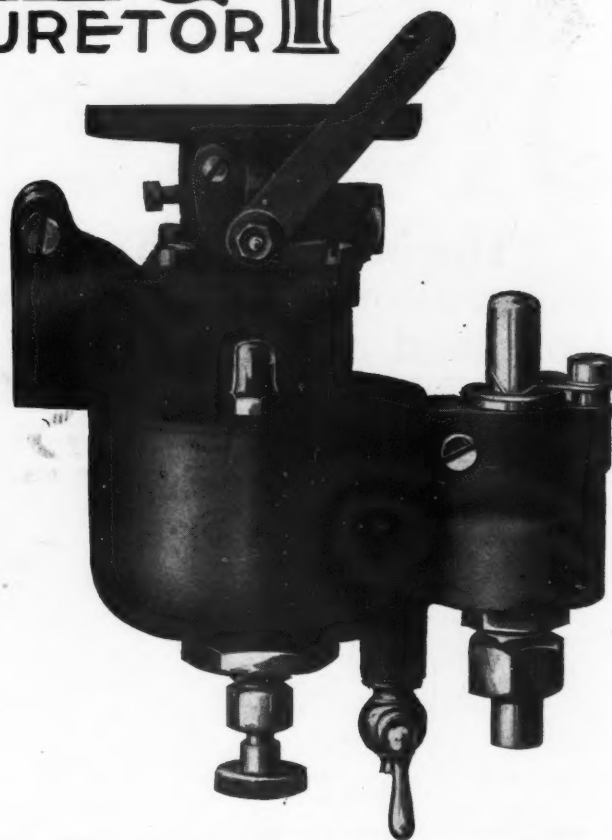
The result is surprising simplicity, wonderful accuracy and great reliability.

Due to its economy, 5,000 miles of driving will pay for a new self-adjusting Holley.

Why not have one on your car?

If you are near no dealer, write direct to

HOLLEY BROTHERS CO.
DETROIT, MICHIGAN



REO ACCESSORIES CO., 1220 Michigan Ave.....Chicago, Ill.
OMAHA RUBBER CO.....Omaha, Neb.
H. F. BROWNELL CO.....Sioux Falls, S. D.
HUGHSON & MERTON, 530 Golden Gate Ave...San Francisco, Cal.
Foreign Branch: HOLLEY BROS. CO., Coventry, England.

BRANCHES:

Los Angeles, Cal.....Hughson & Merton, 1229 So. Olive St.
Portland, Ore.....Hughson & Merton, 329 Ankeny St.
Seattle, Wash.....Hughson & Merton, 924 East Pike St.

Holley Carburetors are carried in stock at the following addresses:
CHAS. E. MILLER, Home Office: 97-103 Reade St., and 121 Chambers St., New York.

BRANCHES:

New York City.....924 Eighth Ave., between 54th and 55th Sts.
New York City.....2782 Broadway, between 107th and 108th Sts.
Springfield, Mass.....Bridge and Dwight Sts.
Hartford, Conn.....274 Trumbull St.
Atlanta, Ga.....66 Edgewood Ave.
Brooklyn, N. Y.....1421 Bedford Ave.
Buffalo, N. Y.....824 Main St.
Albany, N. Y.....135 Central Ave.
Boston, Mass.....202-204 Columbus Ave.
Detroit, Mich.....227-229 Jefferson Ave.
Cleveland, O.....1829 Euclid Ave.
Philadelphia, Pa.....318 No. Broad St.
New Orleans, La.....601-603 Baronne St.
Newark, N. J.....274 Halsey St.

When Writing to Advertisers, Please Mention Motor Age.

THIS IS THE NAME



"Takes the Jar Out of Your Car"

THIS IS THE INSERT

"The Insert of 10,000 Oil Pockets"

THIS IS THE BOX

The Purpose

DANN Ford Insert is a thin perforated lubricant-packed strip of thin metal designed to be inserted from tip to tip between Ford Spring leaves.

Its purpose is to provide perfect and permanent spring lubrication, to prevent springs from rusting, squeaking or breaking, to better the car's easy-riding qualities, to increase car life and second-hand value by dampening mechanism-killing road shocks, and to save wear on tires. DANN Ford Insert gets the maximum shock-absorbing qualities out of a Ford spring by practically doubling the number of its leaves. It comes packed in a box, cut to proper length, ready for immediate installation between the spring leaves of any Ford car.



The Guarantee

DANN Ford Insert is guaranteed to do everything we claim for it—or your money refunded.

If the Insert does not add many times more than \$6.00 to the value of your Ford car, and to the increased enjoyment you get out of it, write us and the full purchase price of the Insert will be cheerfully refunded you and no questions asked.

Write for Free Sample

Free sample of DANN Ford Insert, together with complete descriptive literature will be sent motorists and dealers filling in and sending us the attached coupon.

Price \$6.00 Per Set
At Your Dealers or Direct on Receipt of Price

FORD DEALERS: We want Ford accessory dealers in all parts of the world to act as our agents. Write for generous sales proposition.

Schaefer Sales Corporation
1505 Arcadia Bldg. DETROIT, MICH.

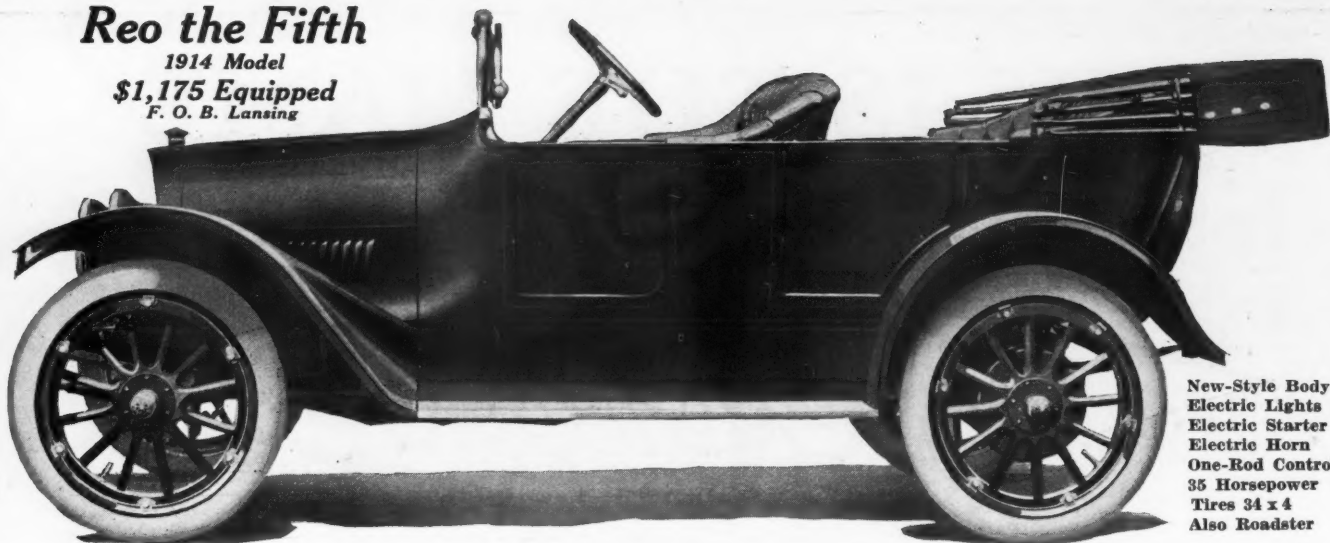
(COUPON)
Schaefer Sales Corporation, 1505 Arcadia Bldg., Detroit, Mich.
Gentlemen: I am interested in getting the utmost service and riding comfort out of my Ford car. Kindly tell me how I can do so by the use of DANN Ford Insert.
Very truly yours,
Name
Address
If a dealer check here []

Reo the Fifth

1914 Model

\$1,175 Equipped

F. O. B. Lansing



New-Style Body
Electric Lights
Electric Starter
Electric Horn
One-Rod Control
35 Horsepower
Tires 34 x 4
Also Roadster

Car or Super-Car

That is the chief question men have to decide in buying a car to keep.

It overshadows everything else.

Almost any car is fit for normal service. There are very few cars which won't demonstrate well, or even run well for a season.

Then is it worth while to build or to buy a super-car like this Reo the Fifth?

Listen to our side of that question.

After 27 Years

Mr. R. E. Olds, after 27 years of car building, says that all these extremes are essential. Not for normal conditions, not for one-season service. But to meet shocks and strains—to withstand years of wear—to save troubles, repairs and upkeep, a car must be built like this.

And no man in the world knows better about that than Mr. R. E. Olds.

Ask any old motorist—men who have been through the mill. They will tell you, by all means, to get the utmost in a car.

They are the buyers of Reo the Fifth—men who know the

penalties of buying skimpy and short-lived cars. By the tens of thousands they are coming to Reo the Fifth. For years they have come faster than we could supply them.

What It Costs

Before we deal with the cost of Reo extremes let us point out our price—\$1,175 with electric starter and lights. Note how it compares with other cars in this class. Note that in the past year, through factory efficiency, we have brought down our price just \$220.

But we add one-fourth to the necessary cost of each car to give you this super-strength. We spend six weeks on each car. We devote a

whole building to tests and analyses. In every part we secure utter exactness, regardless of time or cost.

We use 15 roller bearings, 190 drop forgings. We pay double-price to build you a clutch which prohibits all clashing of gears. We give you big tires.

In the engine we give you full 35-horsepower—far more than you are likely to ever require.

What We Require

We have for years kept test cars on the road. Relays of drivers run them night and day at high speed on rough roads. After 10,000 miles of this reckless driving we take the car apart and inspect it.

We require every part to endure that rough service. And every driving part, after 10,000 miles, must remain almost like new. Every formula, test and specification is based on these requirements.

To insure this, all steel is made to formula and each lot is analyzed twice. Gears are tested in a crushing machine for 75,000 pounds per tooth. Springs are tested for 100,000 vibrations. Engines are put to five radical tests, then taken apart and inspected.

Then we require a big margin of safety. All driving parts in this 35-horsepower car must meet the usual tests required for a 50-horsepower engine.

It Stays New

The result is a car that stays new. It doesn't grow noisy, doesn't show wear and doesn't give trouble. After years of use, with proper care, the car will run like new.

It has strength enough for shocks. It has power enough for hills. There is no clashing of gears to wreck the transmission. There are no flaws, no weaknesses. Every part has vast over-capacity. A car built like this will save the average user hundreds of dollars in repairs and upkeep.

Then note what a handsome car. Note the new streamline body. The finish is perfect, the upholstery deep and luxurious. There are electric lights and starter, demountable rims, dimming searchlights—everything in modern equipment. And this is the only car in which all the gear shifting is done with our simple one-rod control.

Reo the Fifth is sold by a thousand dealers. Ask for our catalog and address of nearest showroom. We are building a beautiful Roadster.

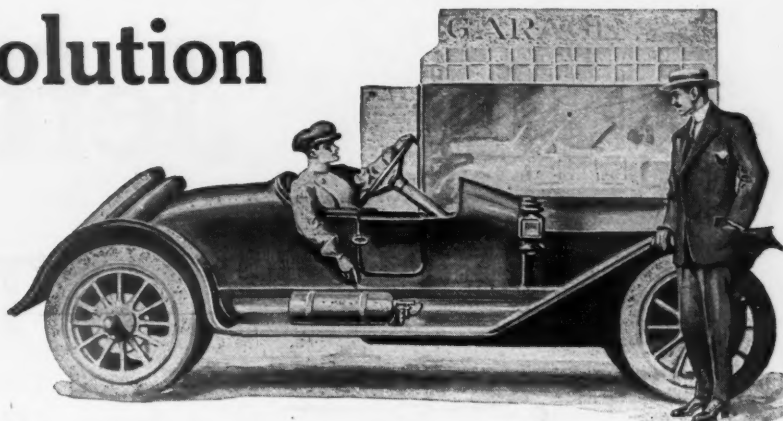
REO MOTOR CAR COMPANY, Lansing, Michigan

Canadian Factory, St. Catharines, Ont. Canadian Price, \$1,575

(251)

When Writing to Advertisers, Please Mention Motor Age.

The Best Solution for YOUR Lighting Troubles



Prest-O-Lite

Proved reliable, efficient and economical on hundreds of thousands of automobiles, everywhere.

You don't have to fool along with any unsatisfactory lighting system.

You don't have to pay for continued "service" or waste your time while an "expert" is searching for mysterious troubles.

The Result of Experience

Boston, Mass.

Gentlemen—We have for some time past been using electric lighting on our car, but have found it to be so entirely unsatisfactory that we are now having our car equipped with Prest-O-Lite.

We do not know as we can enumerate one specific trouble which has been greater than the others and can only say that the entire system is radically wrong from our standpoint, for effective automobile lighting. We have used Prest-O-Lites in the past and shall use them in the future and therefore we are placing our order for a style "B" Prest-O-Lite complete, with all necessary tubing and connections, to replace the electric lighting system now on our car.

C. L. YORK COMPANY,
E. L. York, Treasurer.

From all parts of the country come reports of wise motorists who are tearing complicated, delicate and unsatisfactory systems off their cars and substituting Prest-O-Lite.

Gas lighting saves weight, gives greater engine power, never fails suddenly, is free from trouble and repairs, needs practically no attention.

Your gas lights may be lit, dimmed or extinguished, from the seat, by the use of the Prest-O-Liter.

No matter what self-starter is on your car, your headlights should be gas lights. Reliable light is just as essential as fuel.

Use the Coupon

If you want the facts on all lighting systems, showing how you can save time, money and trouble on YOUR car—use the coupon today.

The Prest-O-Lite Company, Inc.
233 Speedway Indianapolis, Ind.

(Contributor to Lincoln Highway)

Exchange Agencies Everywhere

THE PREST-O-LITE CO., Inc.,
233 Speedway, Indianapolis, Ind.
Send facts on ALL lighting systems to

.....

.....

.....



Jeffery Prop

AUTOMOBILE

April 30, 1914

Reviving Small Fours

THE year 1915 will not be so much noted for sixes as was predicted by not a few makers several months ago. In a canvass of over 25 per cent. of the makers it has been discovered that scarcely a company at present building a four-cylinder model in addition to its six-cylinder program, is going to drop the four for next season. Last year as announcements came out, the story was one of new sixes and dropping fours. Present indications are that there will be many fewer such announcements during the coming fall.

In addition to carrying over many of the present four-cylinder models there are several companies which are bringing out small four-cylinder motors that will list around the \$1,500 mark. These new fours give promise of being the most interesting announcements for the coming season. What the outcome of such models will be is highly problematic in view of the six-cylinders now on the market listing at slightly over \$1,700 or thereabouts. With four-cylinder models at somewhat lower prices, there is promise of a real duel between the four and the six in this price zone next season.

Such a duel will have considerable interest because the sixes selling in this field are supposed to be the last word in efficient motor manufacture in America and the new high-efficiency fours which are at present undergoing test are naturally equally up to the minute. In these new models we will then have fours and sixes battling on almost even terms so far as engineering is concerned. The question to be solved will be, which will give the best satisfaction? With many it is not yet a settled question whether a really permanent and satisfactory six can be produced at \$1,700 or lower, although there are several makers on the market at present listing close to this figure and if they prove a permanent success, as they at present indicate, then the answer will be at hand.

The present fact that several concerns are bringing out small four-cylinder cars for next season must not be interpreted as meaning a decline of the sixes, but rather a further stage in the solution of the problem as to which will be the eventual, the four or the six. Makers are divided on the answer. One maker asserts that when listing a car at over \$2,000, the six has the lead, yet another maker listing at over \$3,000 finds a steady market for his four-cylinder car claiming that his buyers are entirely satisfied, and prefer the four to the six.

No definite trend can at present be outlined that would apply to all in that production is the determining factor with one maker whereas with another limited output with higher price and coupled with more individual options are determining factors. Individuality is bound to be more and more apparent in cars listing at over \$2,000. The entire country has not yet been sold to sixes, there has been a slight reaction set up for the fours, but as to the eventual the answer will be partly found in the performance of the present small sixes as compared with the new small fours coming out during the present fall.

THOSE who are buying Jeffery cars this year must feel a great deal of satisfaction in the continued proof of our earlier statements. Their cars will be right up to date in 1915-16.

Our dealers who have ordered 7000 Jeffery cars since November must feel a certain pride in seeing their assurances to their customers so thoroughly upheld by the highest authorities.

The editors of "The Automobile" now recognize the indisputable fact that Jeffery was right.

Note the article at the left reproduced from their April 30th issue. Not a line of this character could be found in any of the trade journals last summer when Jeffery introduced into this market America's first light weight, high grade, economical car of beauty and comfort.

The talk was all of "light sixes" then, but Jeffery engineers had spent weeks in Europe. They knew that while the light six of quality would always find a market, yet the car for the masses, the economical car, was the light Four of quality, selling at a moderate price.

A few weeks ago D. McCall White, the well known British engineer made his first public utterances before the Detroit section of The Society of Automobile Engineers, following his employment

phhecy Proved

by a leading American automobile manufacturer.

He said substantially that Europe had long since discarded the heavy, slow speed motor along with the bulky, cumbersome, expensive car which it called for. Five years of conclusive experience had proved the light, high speed motor to be the best and most economical engineering practice. They had proved over there that cars equipped with the high speed motor could be guaranteed for years with perfect safety.

Mr. White said he had yet to find the man who did not want all the mileage he could get from a gallon of gasoline or oil and the dollar spent for tires. It now seems a certainty that other makers will pay tribute to Jeffery by producing cars of a similar type—next year. Imitation is indeed the sincerest flattery and we welcome this imitation with hearty good will.

We do not fear this competition because there is embodied in the Jeffery Four, the very best material that the market affords and the best ideas developed by the best engineers in the world.

In the panel to the right you will find our ideas of what constitutes real value in a motor car. We hear a lot about quality. But no such quality is found in any other car on the market at \$1550.

The Jeffery buyer gets not only economy, beauty, quality and comfort, but because Jeffery is a year in advance of American engineering practice and style, his car is up to date when in its second year and therefore has a much higher second hand value. The Jeffery dealer in your town is a good man to know.



These Jeffery Features Spell Real Quality

Imported Annular Ball Bearings. Used by the best cars in the world.

Vanadium Steel Springs, axles and drive shafts. Costs us 17½¢ per pound. Ordinary steel costs 8 cents.

Full floating rear axle. No one can argue against that.

Most expensive starting and lighting outfit on the market. No car selling under \$2500 uses it.

Spicer Universals. Used by the best cars in the world.

Daimler leather couplings. Another proven foreign idea we introduced.

Rayfield Carburetor; the highest priced type, too. That spells economy and flexibility.

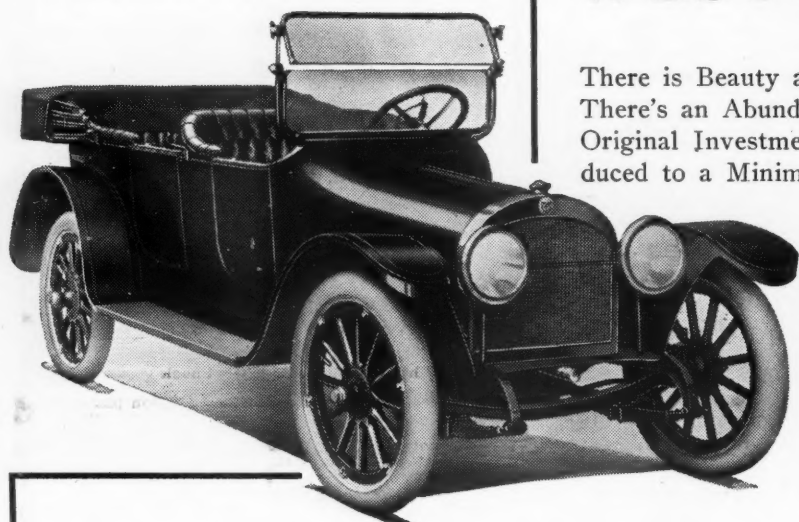
Bosch Duplex Ignition. You don't find it on cheap cars.

Four Speed Transmission. Another feature of the \$5000 cars.

Equipment: Complete and high grade—Warner autometer, Neverleak top, rain vision windshield, Klaxet horn, Solar electric lamps, electric lighted instrument board, oil and gasoline pressure gauges, etc.

The Thomas B. Jeffery Company
Main Office and Works, Kenosha, Wisconsin

The Kind of a Car the People Want!
"Swift, Silent, Sure—Built to Endure"



Silent Northway Motor—Unit Power Plant—Three Point Suspension—Axles, front I-beam drop-forged; rear, three-quarter floating—Left Drive—Center Control—Electric Starting and Lighting—Demountable Rims—Ventilating Windshield—Wheel Base, 113 inches.

Write for Complete Catalog and Specifications

Westcott Motor Car Company
Richmond, Indiana

WESTCOTT THIRTY

Four-Cylinder

There is Beauty and Snap in Every Line of this New Car. There's an Abundance of Power, Strength and Speed. The Original Investment and the Maintenance Expense are Reduced to a Minimum. It is Built for Comfort and Service.

With the Westcott Reputation behind it, it is "Honor Bound to be a Good Car." It's More than that—it is the Greatest Car ever Offered at the Price.

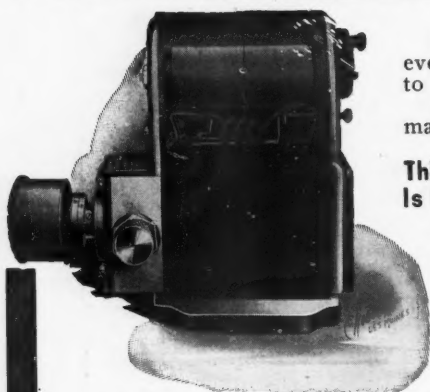
Touring Car or Roadster

\$1285

It's the Way of the Westcott to Win—
 It Wins Both Dealers and Customers.

Ford Owners! Real Electric Light, \$40

With the **NEWOLITE** System—Bright at Any Engine Speed



New Lite is taking hold like wildfire. Garage men and drivers are writing us every day. They're tired giving the Ford magneto a double task and expecting to get results.

New Lite lights from storage battery charged by independent dynamo. Saves magneto. Gives better ignition, easier starting and a clear light at all times.

**This System
 Is Guaranteed**

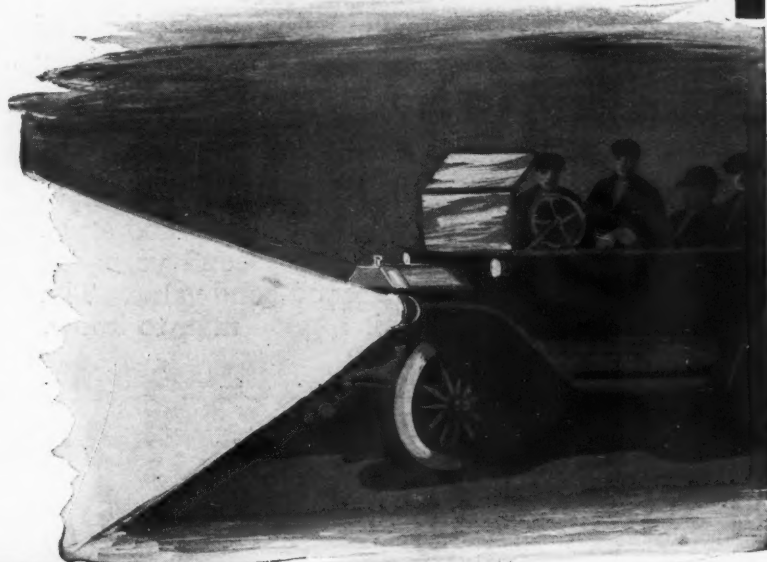
**Live
 Dealers
 Wanted**

New Lite consists of high grade ball bearing dynamo, automatic cutout, six volt storage battery, battery box with lock, two black and nickel bullet head lights with globes, tail light with globe, adapters with globes for side lamps, switch, transmission, and necessary wiring, making a complete plant.

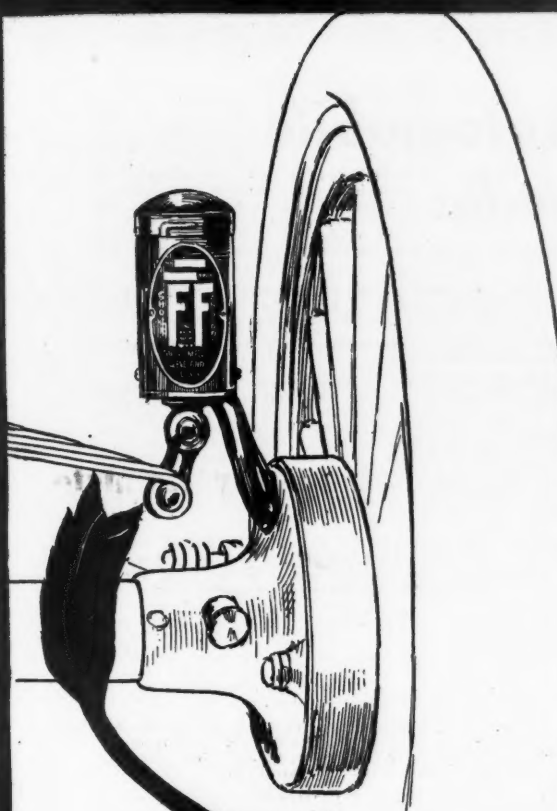
Dynamo can be attached to any car. Will charge any 6 volt battery.

Quotation upon any part furnished upon request. Dealers—Write for Discount

NEW LITE MANUFACTURING CO.
2100 New Lite Bldg., Newton, Iowa



When Writing to Advertisers, Please Mention Motor Age.



France-Ford

SHOCK ABSORBERS

Add to Car Life — Increase Riding Comfort —
Decrease Tire Wear

France-Ford Shock Absorbers permit only the wheels to follow the road surface: The frame, power plant and passengers glide comfortably along.

The large diameter spiral springs of the F-F Shock Absorber actually add 7 ft. of very sensitive spring length to each spring of your Ford car. Consider what this will mean to the riding qualities of your car when added to and working in harmony with the regular springs.

F-F Shock Absorbers are stationary—they cannot rock. They prevent swaying of the car body and improve steering. The wheels hold the road, thus greatly reducing skidding. All parts subject to wear are fitted with bronze bushings, thus prolonging the life of the F-F Shock Absorber indefinitely.

F-F Shock Absorbers offer no objectionable features, such as friction plates, slots or joints to clog with mud, bind, wear, rattle or squeak. All working parts are enclosed in a dust and water-tight housing. F-F Shock Absorbers are automatically oiled. They are not packed with grease, which lubricates very poorly and interferes with free spring action, but a continuous and automatic oiling system is employed.

Anyone can readily install the F-F Shock Absorber.

GUARANTEED SATISFACTORY OR YOUR MONEY REFUNDED

You can try a set on your Ford car for 30 days. Write for full particulars. Made throughout with one-piece drop forgings, we are in a position to absolutely guarantee against imperfections of workmanship or material. Each set is die stamped with a serial number, which is registered in our Service Department, for your protection.

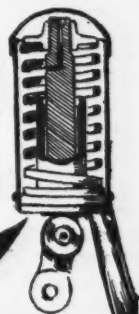
Price \$15.00

For set of four, front and rear. Made in four types: runabout, touring, town car, delivery car. When ordering, specify type wanted.

Ford Accessory Dealers Wanted Everywhere

FRANCE MANUFACTURING CO.

1434 W. 75th St., Cleveland, Ohio



The Oil That Oils But
Does Not Carbonize



Don't Take the Wrong Path, Mr Motorist

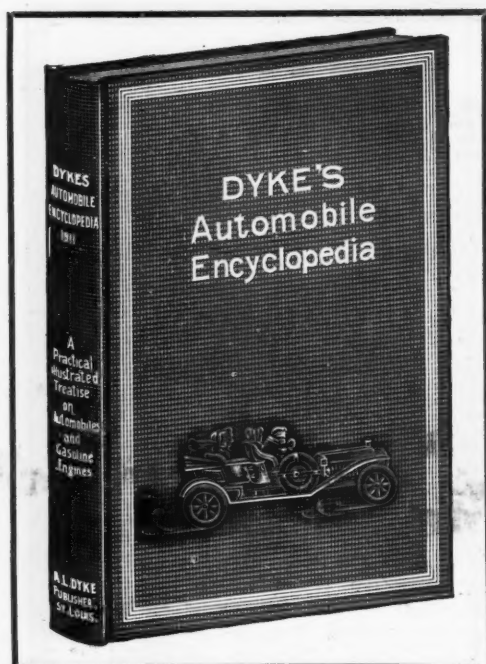
When anyone offers you a "just-as-good" oil at a few pennies less than EAGLEINE NO-KARBON OIL, do not let the immediate saving blind you to the greater expense later on. Poor oil always leads to big repair bills. If you buy poor oil you cannot save, throughout the year, more than three or four dollars; yet when your cylinders become carbon-clogged, piston rings worn out, etc., one repair bill would be many times the total amount you save.

Take the right path at the start. Use EAGLEINE NO-KARBON OIL. It is entirely free from carbon and other injurious ingredients. Its use means a silent, efficient, powerful motor—a motor that is a stranger to the repair shop.

Chicago Branch
1114 W. 37th St.,
Chicago, Illinois

Eagle Oil & Supply Co.
104 Broad Street, BOSTON, MASS.

Roger W. Stadlman,
21 Hoover St.,
Los Angeles, Cal.



Price **Three Dollars** postage prepaid

Address Book Department
CLASS JOURNAL COMPANY
 910 So. Michigan Avenue, CHICAGO, ILL.
 (12)

Dyke's Automobile Encyclopedia

is a simple, practical book written by A. L. Dyke, publisher of the first practical

treatise on automobiles in America. This revised and enlarged Edition is especially prepared for those who want to learn the principle and construction of all parts

of all cars, thereby enabling one to make repairs and adjustments in an intelligent manner.

This book explains the principle and construction of different ignition, carburetion, cooling and lubricating systems, together with the different types of engines and their valve systems; how to set valves, time the ignition, etc.

THE DIGEST OF TROUBLES is very complete—by turning to the index the CAUSE and REMEDY of the trouble is given.

THE ADJUSTMENT AND REPAIR SUBJECT is probably the most interesting. The subject of repairing begins with cleaning a car; cleaning carbon, chemically and mechanically; grinding valves; testing compression; taking up lost motion in valve stems and plungers; setting valves and timing the ignition; how to set all leading magnetos; scraping bearings; how to test for knocks and how to locate them; meshing the timing gears; fitting piston rings; carburetor repairs and adjustments; rewiring a car; ignition troubles and remedies; timer troubles and remedies; cooling troubles; how to clean and repair radiators; how to take up wear in differential; how to adjust the steering device; how to treat the clutch; lining up wheels, etc.

OTHER SUBJECTS—such as Building a Garage for Home or Business; Equipment of a Shop; Tires; Tire Repairs; Vulcanizing; Lighting a Car; Self-Starters; the Assembly of a Car; Transmission; Axles; Brakes; Differentials; Laws; Insurance; Metric Measurements Connected with English Measurements; Care of a Car.

ANOTHER FEATURE OF THE BOOK is the building-up process of a car, from the axles to the body; each part is added by means of progressive charts: First the springs are mounted on the axles, then the frame, then the power plant is mounted on the frame and each and every part is added until the car is completed. In this manner the reader learns the relation of one part to the other. The engine and transmission are assembled in the same manner.

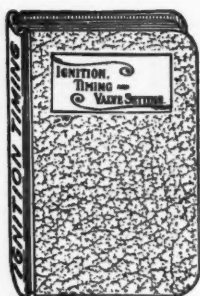
THIS BOOK IS DIFFERENT. The matter is arranged in the form of instructions, of which there are 40. The type is clear. There are over 1000 illustrations, in the form of large, clear charts, of which there are 289. The reading matter is so clearly worded, a ten-year-old boy can understand.

1914 EDITION NOW READY, with 86 pages, 107 illustrations and 118 questions on the principle, construction and care of Electric Starting; Generating and Lighting Systems.

Ignition, Timing and Valve Setting

By Thomas H. Russell, M. E., LL. B.

Author of "Automobile Motors and Mechanism," "Automobile Driving Self-Taught," "Motor Boats: Construction and Operation," Etc.



Pocket size, 225 pages, fully illustrated. A comprehensive illustrated manual of self-instruction for Automobile Owners, Operators and Repairmen.

Cloth \$1
 Binding 1

CONTENTS: ELECTRICAL IGNITION FOR MOTOR CAR ENGINES—The battery and coil system. THE MAGNETO SYSTEM—Low tension and high tension methods.

ANOTHER VIEW OF IGNITION—Elementary electricity—Primary and storage batteries, conductors, etc.—The make and break system—Wipe contact breakers—Advancing and retarding ignition—The Trembler coil theory—The sparking plug—Wiring—Connecting to ground, etc.

MAGNETO IGNITION—The armature winding—Generation of the current—The armature spindle—The Bosch arc light armature—Action of the system—Dual ignition, etc.

GENERAL SUMMARY OF IGNITION—Various systems in former and recent use—The circuits—The contact maker or breaker—The trembler—Ignition for several cylinders—The high tension distributor—High tension ignition by dynamo—Magneto ignition.

IGNITION FAULTS AND HINTS—Testing for causes of failure—Cleaning sooty plugs—Truing up the contact screw or blade contact—Causes of irregular firing—Loose contacts—General troubles with coils—Multi-cylinder timing—Pre-ignition—Spark plug troubles—Short and broken circuits—Adjustments—Care of Magnetos—Magneto hints, tips, etc.

INDUCTION COILS—Principle and construction—Lines of Magnetic force—Primary and induced currents—Action of the condenser—Coils in section and plan.

TIMING IGNITION—Timing with battery and coil—Marking the flywheel—Correcting the "lead"—Timing the coil or coils—Timing the valves—Timing with magneto ignition.

VALVES AND THEIR FUNCTIONS.

VALVE SETTING—Resetting timing gear for all kinds of ignition apparatus.

The Class Journal Co., 910 S. Michigan Ave., Chicago

(11)

A Square Deal for Dealers

Exclusive Territory—Protected Prices

Our dealer proposition recognizes the price cutting evil and guarantees adequate protection.

The Englebert Tyre is a very high-grade Belgian product with a fine and old reputation in Europe. Thanks to the reduced tariff, it meets American prices. It wins on mileage—7,000 miles on heavy cars being about the normal in America and often running much higher.

It is a marvelous repeater because customers who record their mileage are so often astonished. It brings the kind of business that sticks and grows.

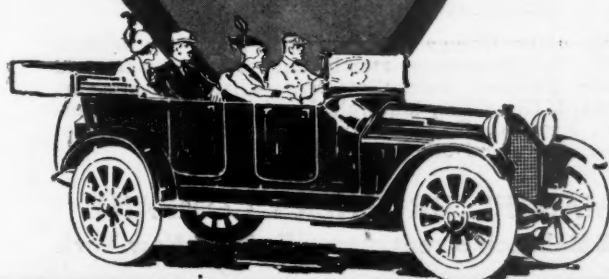
American sizes—Steel Stud, Ribbed and Chevron treads. Clincher and Quick-Detachable Types.

ENGLEBERT TYRE CO., 1928 BROADWAY, NEW YORK



MADE IN BELGIUM

TYRES ENGLEBERT



Where Could You Buy More?

Study the complete equipment that goes with a Glide Model 30—study the guarantee that backs the materials and construction—then ask yourself where could \$1195 buy more?

Westinghouse Electric Starting,
Lighting and Ignition System
Unit Power Plant
Long Stroke Motor
Center Control
Left Side Drive
Gasoline Tank Under Cowl Dash
114 Inch Wheelbase

Motor Driven Tire Pump
Floating Rear Axle, with Pressed
Steel Housing
Demountable Rims
Tire Irons for Extra Tire
Stream Line Body with Concealed
Hinges and Built-In Windshield

And, with the above, the price includes *Top, Electric Horn, Speedometer, Spare Demountable Rim Jack, Tool Kit and Flash Lamp.*

The Model 30 Glide offers everything you could ask for in style and comfort, and its daily use everywhere proves that it provides all you want in power and endurance. Write for catalogs. Ask for catalog on Glide Model 36, selling at \$1840.

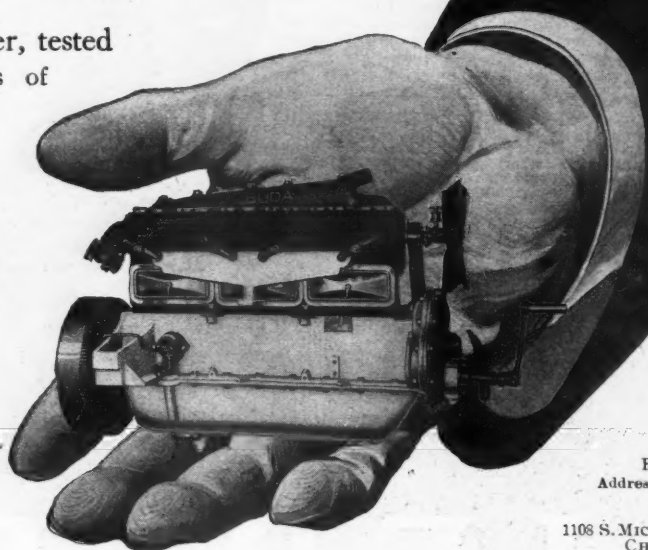
Dealers: Let us tell you how easily and satisfactorily you can make good profits with the Glide agency. Please write us.

The Bartholomew Co., 215 Glide St., Peoria, Ill.

BUDA MOTOR

"The part that sells the car"

Tested by the maker, tested by the manufacturers of cars and trucks, tested by the car owner. Tested for price, tested for endurance, tested for economy, tested for power, tested for silence, tested for oil consumption, tested by every user in the great test of daily use, year after year, *tested* and *tested* and *tested*:— and



The Motor Shown is BUDA Six Model "SS-3"—
3½ x 5½

There's a BUDA motor for every use.

THE BUDA COMPANY

FACTORY, HARVEY, ILL., (Chicago Suburb)

Address all correspondence to our Factory Representatives

BRANDENBURG & COMPANY

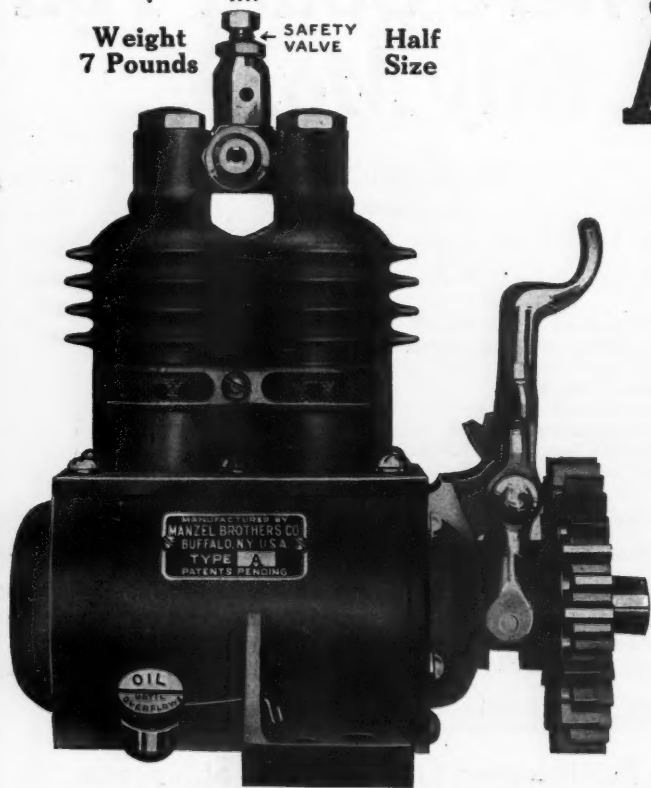
1108 S. MICHIGAN AVE., FORD BLDG., 57TH & BROADWAY,
CHICAGO DETROIT NEW YORK CITY

EACH NEW TEST A NEW TRIUMPH

Weight
7 Pounds

SAFETY
VALVE

Half
Size



MANZEL

ENGINE DRIVEN TIRE PUMP

Let Us Remove the Word
"Pumping" from Your
Vocabulary

The hot days are coming and it is great sport to stand at the roadside and perspire and pump a tire or two by hand, but it's still greater sport to stand in the mud or rain and pump!!!

Equip your car with a power pump. THE MANZEL is ready for immediate attachment to your car. Go to your dealer or write us, giving the name of your car and the model, and we will give you in exchange complete literature concerning the pump, method of attaching it, and the surprisingly low price.

We carry fittings in stock that make the Manzel ready for immediate attachment to Abbott-Detroit, Buick, Cadillac, Cole, Cartecar, Chalmers, Hudson, Howard, KisselKar, Maxwell, Mitchell, Oakland, Overland, Packard, Paige-Detroit, Reo, Speedwell, Studebaker, Stutz and other cars.

MANZEL BROTHERS COMPANY

306 Babcock Street,


Buffalo, New York

The Price of Easy Riding on All Roads
Reduced Expense for Repairs
A Year or Two Longer Service

is \$15, \$20, \$25
Per Set of Four
Half That Per Pair

GABRIEL

SNUBBERS



*As easy
to attach as
a pair of lamps*

Standard Factory Equipment on White,
Stearns, Peerless, Oldsmobile, and Lozier.
Partial or special equipment on over 20 other leaders.

Ask the Engineering Department of Your Car
Booklet and prices sent on request.

Gabriel Horn Mfg. Co., 1415 E. 40th St., Cleveland, Ohio

New Departure Quality, Plus



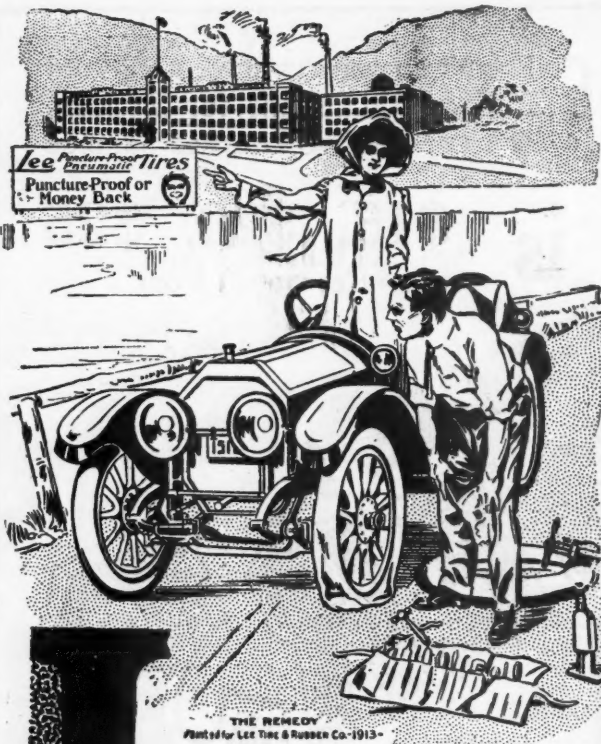
Daily output—10,000 guaranteed, insis-
tently inspected, persistently tested
ball bearings. Quality first.

Actual service of New Departure bearings
proves that we can and do fulfil every quality
requirement of the American car manufacturer,
plus unfailing delivery when wanted.

New Departure bearings are made at home
in the largest ball bearing manufactory in the
world—a factory of ample capacity for quickly
turning out bearings in large quantities. This
should be an important consideration. Con-
tract with us for requirement and by doing so,
avoid serious delays that hold you up.

The New Departure Manufacturing Co., Bristol, Conn.

Western Branch, 1016-17 Ford Building, Detroit, Michigan



Here is the remedy for tire troubles

Thousands of motorists call

Lee PUNCTURE-PROOF OR MONEY BACK Pneumatic Tires

"the tires that put the sure in pleasure."

Hundreds of dealers, with their eyes and ears wide open to the demands of the car owners, have investigated the proposition. They were skeptical till they found:

First—That this was a real pneumatic tire, made of

"Vanadium" Rubber

the improved Lee process that assures longer life, greater resiliency and comparative freedom from oil-rotting.

Second—That the protection against punctures was **within** the casing.

Third—That the overlapping layers of armor-steel discs absolutely protected the carcass and inner tube, and that the rubber and fabric layers between discs prevented working loose or heating.

Fourth—That here was the **only** pneumatic tire sold with a

Money Back Guarantee

which assured the return of every extra cent paid if the tire failed. (The car owner cannot lose—he is sure to gain in time, money and reduced cost of inner tubes.)

Such evidence turns skepticism into action—the sort of action that pays profits. You'll find no Lee dealer who isn't enthusiastic on this puncture-proof proposition.

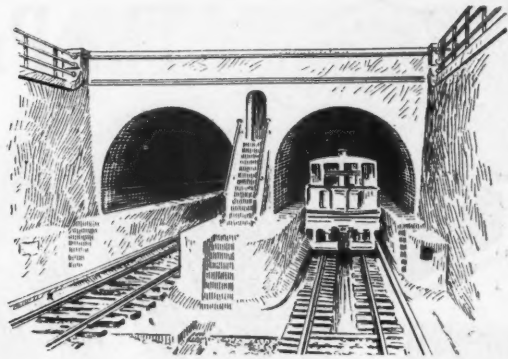
Why don't you get into action today? Get our Dealers' Proposition "U" on the tire that

"Smiles at Miles"

and smile at competition yourself.

Lee Tire & Rubber Company
Conshohocken, Pa.

Kelly-Field Co., General Sales Agents,
1737 Broadway, New York



POWER to move all trains through the Detroit River Tunnel comes from the largest storage battery plant of its kind in existence. The

Gould Storage Battery

used exclusively throughout has given excellent satisfaction.

Likewise, the Gould Battery for vehicle propulsion has maintained supremacy through our desire and ability to build the best.

Our vehicle types are made as carefully as the batteries we furnish for driving rush hour trains in the Grand Central Terminal, New York, for driving New York street cars, for driving submarine naval vessels, for firing big guns of the army and navy, for lighting trains on all prominent American railroads, etc.

If you want the best that exists in storage batteries and you appreciate liberal treatment, try the Gould Battery. (Our battery renewal plates fit jars of any make.) Our engineering advice is yours for the asking.

Gould Storage Battery Co.

General Offices: 30 E. 42d St.,
New York City

Works:
Depew, New York

Boston—14-16 Cambria St.

Philadelphia—613 Betz Bldg.

Cleveland—1761-5 E. 18th St.

Detroit—88 E. Congress St.

Chicago—The Rookery

San Francisco—1440 Van Ness

Ave.

Los Angeles—110 E. Pico St.

Agents in
Washington, Rochester, Buffalo, Pittsburgh, Milwaukee, Minneapolis, St. Louis, Kansas City, Omaha, Denver, Topeka, Seattle

CANADIAN REPRESENTATIVE:
R. E. T. Pringle, Toronto, Montreal, Winnipeg, Vancouver

Full stock of parts, plates and repairs carried by all offices and agents.

(91)



Luxury Without Undue Expense

YOUR stay in New York will be attended by utmost comfort combined with reasonable expense if you live at the McAlpin. For while the McAlpin is the largest and safest of the great hotels of the world the moderation of its charges is notable.

At Broadway and 34th Street—only a block from the Pennsylvania Terminal and a short distance from the Grand Central Station—with car lines reaching everywhere at its very doors—the McAlpin is the focal point of New York's activities.

Only across the street are many of the city's best shops—theatres are right at hand—executive offices of great corporations can be quickly reached or consultations at the McAlpin made mutually convenient.

Added, are many features unique in modern hotels, Hydro-therapeutic Baths, Women's Floor, Men's Lounge, etc.—and the earnest endeavor of a hotel organization intent on making your stay enjoyable.

Do not fail to visit New York's most notable hotel.

Management of MERRY & BOOMER

HOTEL McALPIN

Herald Square

NEW YORK

Nearer than Anything to Everything



U.S. and
Foreign
Patents
Applied for

SPEED UP!

If your car "lags"—loiters on hills—stalls in the mud and sand—and takes the dust of cars with little over half its horsepower, your compression is poor and your piston rings are leaking. What you need to speed up is a complete set of—

McCadden Leak-Less PISTON RINGS

Take your car to your repairman. Tell him to equip it with McCADDEN Rings. If they don't give perfect compression, increase your power, decrease your fuel bills and lessen carbonization—send them back to us and we will refund their full purchase price.

SATISFACTION GUARANTEED OR MONEY REFUNDED

Take pride in your car's power! Write for prices and descriptive literature today.

McCadden Rings are Flexible —Self-Adjusting

Note the perfect joint. Gas cannot escape past the lap; it cannot go under because of the inner ring. McCADDEN Piston Rings hug the cylinder—conform to its contour. No matter how much the cylinder may wear the leakless joint of the McCADDEN Ring is not affected. The McCADDEN Ring is a concentric 2-piece ring made of specially processed gray iron. The inner or expanding ring presses the face of the outer ring flush against the cylinder walls. The McCADDEN Ring reduces tremendously the friction caused by old style rings, thereby making for greater speed and less cylinder wear. McCADDEN Rings are pinned in such a fashion that the pin is concealed and cannot possibly work out. These rings can be quickly attached by any one by simply snapping them over the piston with thumb and finger. U. S. and foreign patents applied for.

*Full Descriptive Literature
on Request*

DEALERS AND JOBBERS: Here is a guaranteed quality ring at a reasonable price. Write for generous sales proposition.

McCadden Machine Works
St. Cloud, Minnesota

MAKE \$250.00 A MONTH Repairing AUTO MOBILE TIRES

Sounds like a lot of money
—IT IS—A WHOLE
LOT of MONEY to be earning
CLEAR every month—yet it's
what hundreds of men we have estab-
lished in the Automobile Tire Repair
Business are making. You let down the
DRAW BRIDGE for SUCCESS to enter into
your career by getting into business for your-
self. The business for you is the one where in-
vestment is small—the returns quick and for
cash—where the margin of profit is large—the de-
mand for your PRODUCT or SERVICE constant
and ever on the increase.

A HAYWOOD TIRE REPAIR EQUIPMENT

answers to all of these requirements of Old Dame Fortune—The certainty of success in this business is as sure as anything in this world can be—Each year adds thousands of new Automobile Owners—they need YOU to keep their tires in service.

Here Is Your Opportunity!

Be first to enter this new big paying business in your town. Open your pockets. Let the dollars pour in. Act quick. Every auto sold means more tires to mend. Automobile business is growing fast—enormous field for tire repairing. Punctures and blowouts are common. Tires need retreading and vulcanizing. Something going wrong all the time. Thousands forced to buy new tires because they can't get old ones fixed. Think of the old bicycle days—repair shops on every corner—all making money—busy day and night. Autos make same proposition over again—only ten times bigger and better. Users of Haywood Tire Repair Plants are making big money. Johnson, Tex., writes: "I have made as high as \$18 in a day." Another man who bought a plant September, 1911, writes he has cleared over \$3000.00. That's going some! Operate a plant as side line in connection with auto business—garage or as an independent business. Find neighborhood where there's a bunch of autos—get all the steady business besides transient work. Experience unnecessary. You learn quick. Simply follow directions—practice a few days on a couple of old tires and you'll be ready to coin money. Business comes fast and easy.

Repair Tires At Home

Young men! and boys repair father's tires—get money he pays garage man. Get the neighbor's work. Make money to attend college or to start a garage and repair business.

Auto Owners—Repair your own tires—save money—pay for your outfit in short time. We have outfits for home use. Anyhow, investigate. Send today for catalogue. See the wonderful possibilities in this marvelous field. Learn of the enormous money-making opportunities in this fascinating new business.

Haywood Tire & Equipment Co.
720 N. Capital Ave., Indianapolis, Ind.

The New Money-Making Business
—Start Now—This Man Is Making Money

Business Keeps Coming



Put Yourself Where This Man Is

LEWKOWICZ

Give Pleasure Comfort Protection

CONVERTIBLE BODIES



Patents Applied for

Converted
IN LESS THAN

ONE MINUTE'S TIME

FROM A

Touring Car to a Closed Car
WITHOUT THE USE OF
Any Tools! Screws! Bolts! Pins!



Patents Applied for

Manufactured for EVERY MAKE of CAR
FROM A

Ford to a Pierce Arrow

PRIVATE OWNERS---Write for particulars on your cars!

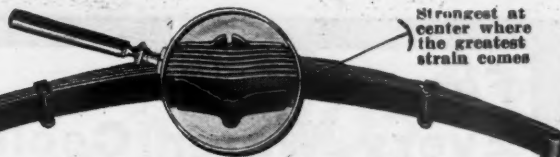
AGENTS---Write for our agency proposition!

MANUFACTURERS---Write for license rights for this wonderful invention which is a necessity today!

Convertible Automobile
Body Corporation

OFFICE AND FACTORY:

1885 Park Ave., cor. 128th St., New York City
Phone 3478 Harlem



You Can Depend on Tuthill for Prompt Service on Repairs

Car Owners and Repair Men will be glad to learn that we have a Service Department that will assist them in making prompt repairs of broken springs, or supply them with a Tuthill Titanic Spring to fit practically any make of car on the market. Simply write or wire us the name of the car and model, and we will make immediate shipment.

The price of the Tuthill Titanic is lower than other springs of the same high quality and workmanship, the repair man makes a bigger profit, and the car owner gets a better spring.

Tuthill
Titanic Unbreakable
Spring

Guaranteed Absolutely Against Center Breakage

The owner of an automobile wants a spring that he can depend upon—even under unusually severe conditions—not to break. The cause of 75% of all spring breakage is directly caused by the weakening center bolt. The Tuthill Titanic eliminates the center bolt—and is strongest where the greatest strength is needed.

A Series of Rigid Tests at the factory disclose any possible weakness and enables us to turn out an absolutely perfect spring—one that won't break.

UNRESERVED GUARANTEE AGAINST CENTER BREAKAGE The Tuthill Titanic Spring, of approved design, is guaranteed absolutely not to break at the center. Should any breakage occur—which is a very remote possibility—we will replace the spring, and pay express charges on the new spring. This is in addition to the regular Tuthill Guarantee which goes with every spring. No other manufacturer makes this guarantee because only the Tuthill Titanic Spring is unbreakable. Get our price list today.

TUTHILL SPRING CO.

762 Polk Street

Chicago

1724

Tuthill Titans are guaranteed not to break at center



Use them every night

EVERY night when your car is idly standing on the garage floor, there is a tremendous life-crushing pressure bearing down continually, at one point, on your tires—a constant, weakening strain which stretches the fabric—literally kills the rubber—and steals away mileage that belongs to you!

Moore Jacks

The Standard Tire Savers

cut tire costs squarely in half—give you double mileage out of every tire you buy. Easily operated—by anyone. Simply slip padded loop over hub and press down lever—and the heaviest car is raised clear of the rubber-rotting grease on the garage floor. All of the weight of the car is lifted off the tires—in two minutes' time or less!

Moore Jacks are easiest to operate—quickest acting—most durable. A simple lever-lift raises heaviest car. The bridge truss construction of the frame guarantees life-time service. And because of the broad base of the jacks, the car always stands steady.

A set of 4 Moore Tire Saving Jacks will cost you \$6.50 (for Ford cars, \$5.00; for 37 to 42 inch tires, \$7.50). If your dealer cannot supply you use the coupon—today. Money back immediately if you say so.

Walker-Moore Mfg. Company

Makers of Tire Saving Jacks, Lifting Jacks and Ford Specialties

332-338 Wisconsin St., RACINE, WIS.



WALKER-MOORE MFG. CO.,
Racine, Wis. M. A.

I enclose \$..... Ship at once
—all charges paid—one set of four
Moore Tire Saving Jacks.

Name

Address



E. Z. Rider Shock Absorbers Open a Great Field of New Business

Mr. Dealer: There are over half a million Ford Cars in use today—and they are increasing at the rate of 30 an hour. There are hundreds and perhaps thousands in your city.

Here's an article that every Ford Car Owner will buy. Think what an immense new field of business we have opened up to you with

E. Z. Rider Shock Absorbers Make Fords Ride Joy-Easy

They give the Ford that luxury of riding-ease that is only enjoyed in the most expensive cars. E. Z. Rider absorbs the jars, jolts and vibrations; insures the passengers of comfort; saves the wear and tear of the mechanism; saves engine trouble; saves tires. They are dust proof, trouble proof, long wearing, easy to put on and fully guaranteed. Do not affect steering control.

Built for Fords—Fill a Great Need

Ford Car Owners have been waiting for this great bump and trouble saver, built expressly for Ford Cars. They will buy E. Z. Rider on sight. They won't be without these E. Z. Riders for three times the cost, when once they know.

Will Create the Demand

We are conducting an extensive advertising campaign to Ford Car Owners, which will create a big demand for E. Z. Riders. We want you to be prepared to fill orders. Will you do it?

Price \$15.00 set of Four

E. Z. Rider Shock Absorbers sell everywhere at \$15.00 a set of 4, front and rear. And they are selling like hot cakes. They please wherever they go. We guarantee satisfaction—absolutely.

Sold on 10 Days' Trial

E. Z. Rider has proved so satisfactory in every test, by users; and we are so sure of our product that we will allow you to put them out on 10 days' trial. If any buyer is not satisfied, refund the money, and we'll back you up.

Be Ready to Fill Orders

If you want to fill orders for E. Z. Riders, send today, and ask for our special selling proposition.



The Forest City Electric Co.
5014 Windsor Ave. Cleveland, Ohio

For Every Water Cooled Car On Earth



Makes a cooling system be good

If your car is water cooled, you now have, or will have trouble from the "scale" which forms from the water and coats the inside walls of the radiator, water jackets and connections.

"Scale" destroys power, clogs water channels, causes overheated engines by blocking circulation and then finally eats holes through the radiator. It causes more trouble and costs money.

Radiatol will prevent it in the new car and stop it in the old. Radiatol is the chemical neutralizer of all lime, alkali and acids that cause "scale."

Radiatol may save you 50 times its cost in less than three months. Send for our little folder about cooling system troubles, or send \$1.00 for a trial package which we will send prepaid by parcel post.

Dealers should get our dealers' proposition.

Wills Chemical Company

Department B

Wheeling, W. Va.

A Reliable Electrical Measuring Instrument Indicates Quality



Weston Model 267 Dashboard Ammeter

WESTON AMMETERS

for control of **Electric Lighting and Self-Starting Systems** are the most reliable, durable and highest grade instruments made for this purpose

Please send for our 30-page bulletin No. 8 describing them

Weston Electrical Instrument Co.
NEWARK, N. J.

New York	Boston	Denver	Birmingham	Montreal
Philadelphia	San Francisco	Cleveland	Toronto	Paris
Chicago	St. Louis	Detroit	London	Berlin

O-We-Go \$385 Cyclecars

We are now
ready to make
immediate deliveries

SPECIFICATIONS

Motor—2 cylinder 4 cycle "V" 45 degree, air cooled, 10-12 horsepower.

Transmission—Special O-We-Go Friction.

Drive—Two 1½ inch "V" Belts from Jack Shaft to rear wheel pulleys.

Steering—15 inch wheel, worm and gear type.

Control—Spark, Throttle and speed lever on steering column and foot throttle accelerator.

Wheels—Highest Grade Wire.

Brakes—Expanding in rear wheel drums.

Tires—28 in. x 2½ in. Studded Tread.

Tread—36 inches.

Wheelbase—104 inches.

Body—Streamline, 2 passenger tandem or one passenger with delivery body.

Springs—Full cantilever.

Clearance—9 inches.

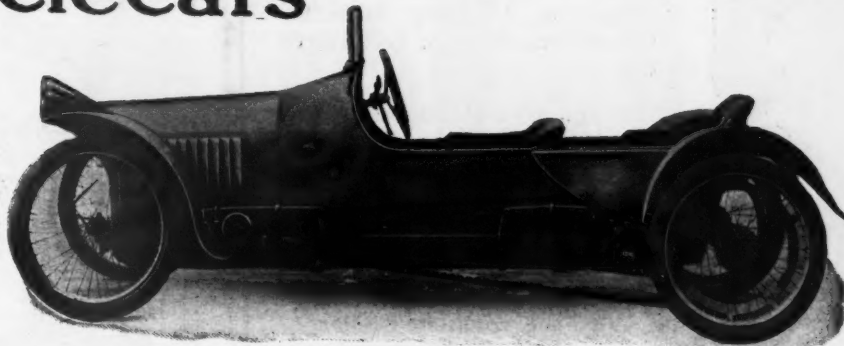
Speed—40 miles per hour.

Weight—600 lbs.

Fuel consumption—40 to 50 miles per gallon.

Equipment—Electric lights, wind shield, horn and tools.

Price—\$385. F. O. B. Owego, N. Y.



We are prepared to ship cars immediately—this means that if you order a demonstrator now, we will ship it the day order is received.
We have an output ample to care for our dealer demands and welcome our agents or prospective dealers who wish to visit our factory.

O-WE-GO ECONOMY

The careful owner, the man who has driven cars year after year—one car after another—has kept records—and the tale revealed by these records has opened his eyes to the real cost of his car.

If the life of a Cyclecar or Automobile is 5 years—

Then the cost of the car is the first cost, plus upkeep—plus gasoline and oil for the full period.

On this basis, in actual economy of operation and in real ability to keep out of the repair shop—the O-WE-GO Cyclecar is the lowest priced four wheeled motor vehicle in existence. If you haven't already written us, send for O-WE-GO literature.

OWEGO CAR CO. Department D OWEGO, N. Y.

\$4.00 Invested
Today

WILL SAVE YOU

\$50 this year on
your gasoline bill

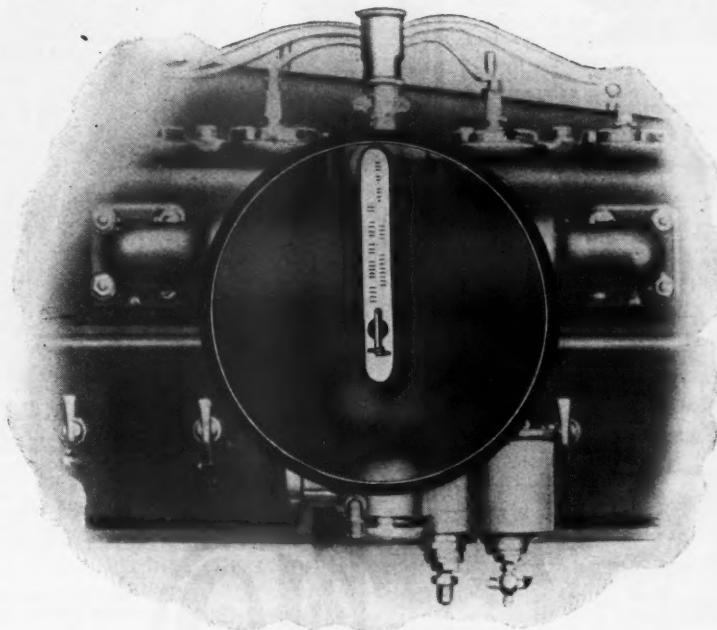
WIARD FAMOUS AUTOMATIC SPEEDLER

Economy is the
watchword of the
hour.

Mr. Manufacturer

Mr. Dealer

Mr. Owner



A Real
Gasoline Saver

No moving parts to
get out of order. The
heat of the motor
automatically oper-
ates it.

Guaranteed to save
from 25 to 50% or
purchase price re-
funded.

WIARD AUTOMATIC AIR VALVE COMPANY

Distributors for Great Britain and the Continent:
THE YOUNG, SANDWITH SALES CO. London, England.

United States and Canada:
BRESLER-WALLACE SALES CO. 1031 Dime Bank, Detroit, Mich.

When Writing to Advertisers, Please Mention Motor Age.

"WHITNEY" Silent Chains

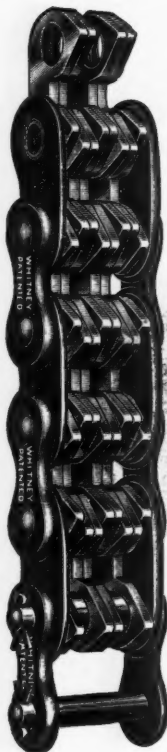
For driving Cam Shafts, Magnetos, Lighting Systems, Generators, Pumps, Self-Starters, etc.

If you are contemplating the use of silent chains, don't fail to try the "Whitney." We have made chains for years and have the most complete and modern factory of its kind in the country.

We have completed a large addition to our factory and are now prepared to make prompt delivery.

Send for catalog D, it contains useful data and information for engineers and designers.

The Whitney Mfg. Company
Hartford, Conn.



Again

"The V-Ray Spark Plug Proves Itself"

—the BEST Plug on the Market

The Annual Gasoline Economy Contest, held under the auspices of the Chicago Automobile Club, May 1, 1914, was won by the six-cylinder, air-cooled FRANKLIN, with a phenomenal mileage of 31.3 to the gallon. V-Ray plugs were used, again demonstrating our claim of

More Power on Less Gas

For over four years V-Rays have contributed to the winning of every Gasoline Economy Contest. Remember



next time, Mr. Motorist; you'll never use any other once you try them.

THE V-RAY COMPANY
Marshalltown, Iowa



Regular
Porcelain
Type

TWO TYPES

Porcelain \$1.00

MIKA \$1.25

All Dealers—All Jobbers.



Model T Runabout \$500

Model T Touring Car 550

Model T Town Car 750

With Full Equipment f. o. b. Detroit

FORD MOTOR COMPANY
Detroit, Michigan



For Ford Cars—For Any Car MAYO SPARK PLUG PUMP

Lowest priced, full-grown power pump obtainable complete with gauge and all connections. Price, \$10.00. Mayo Quick Detachable Spark Plug, \$1.50 extra. Not a miniature pump. Built like a motor and will last as long. The original spark plug pump. Beware of infringing pumps.

\$10

Try a Mayo Free on
Your Car for 30 Days.

MAYO MFG. CO.
55 E. 18th St., Chicago





"I Carry My Autowline Under The Cushion"

Don't think of Basline Autowline as heavy and bulky, like Manila rope. Basline Autowline is about 25 feet of steel wire rope no larger than a lead pencil but just as strong, size for size, as world-famous Yellow Strand rope that contractors use on great construction jobs everywhere. Basline Autowline weighs but 4½ pounds. Coils snugly, with slings and hooks, ready for instant attaching. Stowed under a cushion, where most motorists carry it—

Basline Autowline

"The Little Steel Rope With the Big Pull"

is out of the way till you, or the other fellow, needs a tow; then it's the handiest thing on the road. Basline Autowline is strong, flexible, long-lived; is no experiment but has already been severely tested by several years' actual road service. Sold by all dealers. Price, east of Rocky Mountains, \$3.95. Why not get a Basline Autowline? Some day you'll need it.

FREE An illustrated circular telling all about Basline Autowline.

Broderick & Bascom Rope Co.
813 N. Second St., St. Louis, Mo.
New York Office, 76 E. Warren St.
Manufacturers of famous Yellow
Strand Wire Rope, that is used
by big contractors every-
where



**NO
MAN
S
RICH
ENOUGH**

to afford a cheap Plug in his motor. A poor spark requires a richer mixture and more gasoline. Cheap Plugs, with their cracking Porcelains or oil-soaked mica, lose half the current.



**MILLIONS
ARE
SPENT
TO
ADVERTISE
PLUGS**

The millions of delighted users of the HERZ PLUG are our advertisement

Buy HERZ PLUGS

They will prove the best investment of your life, one that will bear rich interest in

Smaller Gasoline Bills

ASK YOUR DEALER

HERZ & CO., 245 W. 55th Street (Just off Broadway.) New York

FORD Something BETTER



USE PEDERSON "UNITED" TERMINALS

on your Ford. The greatest improvement you can make. Only 50c by mail, postpaid. Oil your Ford from the seat. The Pederson Sight Feed Lubrication does it. We also manufacture for Ford cars the Handy Gasoline Turn-Off and the Stay-On Belt Holder.

Write today for our new Catalog just off the press

Pederson Lubricator Co., 638 First Ave., New York, N. Y.

"WARNER GEARS—STANDARD FOR YEARS"

"It's an absolute impossibility to 'open up' a plant and immediately deliver efficient gear assemblies.

"It takes time and experience—especially experience—to enable a concern to ship really dependable parts.

"This is an undisputable fact, no matter what the business happens to be.

"We are surely capable, in lieu of these facts, as for thirteen years we have been manufacturing automobile gear parts for the most successful and best known motor car manufacturers in the country.

"And listen, what is more, we've been pleasing them in every particular.

"Is there any better proof of a product's merit than one hundred per cent of satisfied customers?

"Looks as if we ought to be able to please you too."

WARNER GEAR CO. MUNCIE-IND.

DETROIT OFFICE—628 FORD B'L'D'G.



The "Hassler"

FORDShock
Absorber

Different from all others, and many times better. Thousands in use. Many Ford dealers are now using the "Hassler" exclusively. Attractive proposition to Special Agents with demonstrating cars in unoccupied territory.



Robert H. Hassler
W. Tenth and Canal Sts.
Indianapolis, Ind.



SPLITDORF MAGNETOS—low and high tension—are made in a wide range of models for all manner of work and they'll give your motor more power—make your motor run smoother and quieter than will any other make, and, equipped with one, you can always start your engine on a quarter turn.

We'll exchange your present magneto of any make on a liberal allowance basis for an up-to-the-minute SPLITDORF low or high tension.

SPLITDORF PLUGS are not experimental—they are standard. Known since their first appearance as the "common sense plug" they are exactly that—no more and no less. **SPLITDORF PLUGS** will outlast your motor—thousands are rarely removed from a cylinder head. There is nothing fanciful about them—they are made to endure any and every strain of ignition put upon them.

SPLITDORF ELECTRICAL CO.

98 Warren Street

NEWARK, N. J.

Starting - Lighting - Ignition

REMY

Apparatus & Organization of Constant Service

A FACT!
Equipment and Service Gives
Motor Cars Their

REPUTATION**REMY****"Standard of the World"****Starting - Lighting - Ignition**

A Service Station in Every Motorina Center.

REMY ELECTRIC COMPANY

Laboratories - Factories - General Offices

Anderson Indiana

BRANCHES

New York Detroit Kansas City Minneapolis Boston
Chicago San Francisco**How You Can Help**

*"A continuous, improved highway from the
Atlantic to the Pacific"*

Do you want to be one of that great army of progressive patriots who are helping to build a greater, more beautiful and more prosperous America?

Do you want to join with a million other practical dreamers, in the pushing through of an unselfish work which means more business, more pleasure, more education and more advantages to all?

Do you want to help in the building of an eternal monument to the greatest name in the history of our country, to the greatest man the nineteenth century produced—Abraham Lincoln? If you do, join the Lincoln Highway Association.

It's a great organization—a grand work to feel in sympathy with—costs but \$5.00, payable once. Get out your check book now—here's a chance for you to build a portion of an eternal monument, the longest improved road in the world.

Send the five to

The Lincoln Highway Association
Dime Bank Bldg., Detroit, Mich.

We have a set of Lincoln Highway pennants for your car, which will come to you for a dollar, prepaid.

A big map of the United States, showing the route of the Lincoln Way, is a fine thing to have on the wall of your office; it's backed with cloth, printed in three colors, and costs \$2.00. All the real Lincoln Highway boosters are wearing a little red, white and blue lapel button—they're twenty-five cents. Wear one.

You cannot run your car with any old air pressure in the tires and expect the tires to last.

Tires are built to withstand a definite and specified air pressure.

You can only get maximum service when you inflate them to the exact air pressure needed, and maintain that specific pressure at all times.



ONE DOLLAR

invested in the purchase of a **SCHRADER UNIVERSAL TIRE PRESSURE GAUGE** will save you hundreds of dollars for new tires.

For Sale by Tire Mfgs., Jobbers, Dealers, Garages, or

A. SCHRADER'S SON, Inc.

783-791 Atlantic Ave.

Brooklyn, N. Y.

Acme Torsion Springs



Could we make a stronger guarantee? And notice it is not a mere claim—it is a positive guarantee.

WHY? Because ACME TORSION SPRINGS are based on SCIENTIFIC PRINCIPLES, properly applied. ACME TORSION SPRINGS, the only practical device on the market that can act FREE with, and CONTINUOUSLY IN CONJUNCTION with the LEAF SPRINGS, any way they are called upon to work, and adjust themselves MECHANICALLY to all conditions.

We Challenge Contradiction of Our Claims

Get an Expert's Opinion

Equip your car with **ACME TORSION SPRINGS**

Insurance for life of occupants, car and easy riding. Don't be fooled by "shock absorbers." What you want is more spring capacity under proper Automatic Control. Acme Torsion Springs add at least 18 feet to the total leaf spring area, every inch adding greater resiliency automatically controlled.

Acme Torsion Springs stop vibration, prevent spring crystallization and breakage, minimize tire and engine trouble, and improve the riding qualities of any car at least 100%. They cost less than half the price of shock absorbers, and are worth several times as much. **Eliminate Vibration and you eliminate trouble.** We have convinced thousands, let us convince you.

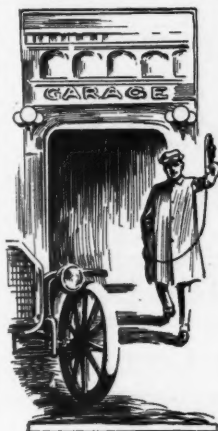
N. B.—Acme Torsion Spring Equipment is fully Guaranteed against Defects and Breakage for the life of the car.

Write today for information.

Acme Torsion Spring Co.
994 Boylston St., Boston, Mass.

WARNING!

Acme Torsion Springs are covered by letters of patent, and we have the sole and exclusive right to manufacture, use and sell the same. Take warning that our interests will be protected.



His Best Purchase

The Brown Jr. Tire Pump

This man has just invested \$7.00 in a Brown Jr. He's never going to pump his tires by hand again. Says it's hard, dirty, back-breaking work.

Perhaps he doesn't know it, but he's going to save a lot of money on tires this year, too. When the motor does the pumping, there's no excuse for under inflation.

The man who owns a small car will get the worth of his money in time and strength saved the first month, to say nothing of the saving in tires.

Why not ask your dealer about this practical pump at the sensational price? We'll tell you all about it if he can't.

If you don't want to fuss with a wrench in removing a spark plug, you can buy this pump and a Brown Q. D. Spark Plug for \$8.50.

The Brown Company

120 BELLEVUE

SYRACUSE, N. Y.



The gallon measure of the oil man too often gets the generous bedamning that should rightfully fall on a "short mileage" carburetor. Every gallon is a "big" gallon if it is handled by a—

Motsinger
Carburetor increased mileage guaranteed

Let us show you how to pare your gas bills down to what they should be.

Then instruct your repairman to install a **MOTSINGER**. If it doesn't increase your mileage—we take it back—refund its full purchase price. You can't lose. Write us.

Motsinger Device Mfg. Co.

883 Putnam Street

LAFAYETTE, IND.

Write for interesting literature describing how and why we can guarantee the **MOTSINGER** to pay for itself.

THE LEVER WEIGHS OUT A JUST RIGHT MIXTURE HERE



NEW TYPE

Electric Searchlight

and "NEWTYPÉE JR."

FOR AUTOS AND BOATS

Powerful searchlights which can be turned in all directions and will stay locked wherever set, without adjustment.

ANY DRIVER CAN ATTACH INSTANTLY
Special FORD Model **Prices \$5 and \$9**
 COMPLETE WITH WIRING AND BRACKETS
THE WOOD MFG. CO., Fairfield, Conn.

Without lubrication your car can be ruined in a ten-mile drive. Hence, you see the question of using

TRADE MARK REGISTERED IN
NON-FLUID OIL
 UNITED STATES PATENT OFFICE

(which insures you perfect lubrication)—IS AN IMPORTANT matter. NON-FLUID OIL is unquestionably the best in points of lubricating qualities of any lubricant on the market today. Not BEST because we say so, but best because NON-FLUID OIL proves it. TRY IT.

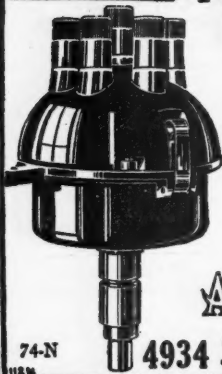
Sold by leading supply houses and garages, or write to

New York & New Jersey
Lubricant Co.
 165 Broadway, New York
 1430 Michigan Ave., Chicago



The Atwater Kent

Ignition System



For every kind and make of motor. A system ideal in efficiency, simplicity, and reliability.

Write today for booklet A.

ATWATER KENT MFG. WORKS

74-N
 4934 Stenton Ave., Philadelphia.

SALISBURY

AXLES WHEELS
PROPELLERS

Salisbury Wheel & Mfg. Co.
 JAMESTOWN, N.Y.

HOUK

Detachable

WIRE WHEELS

"The wheel that makes any car modern"

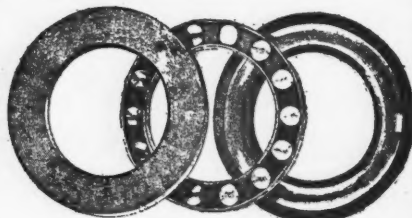
Houk Mfg. Company 1700 Elmwood Avenue, Buffalo, N. Y.
 For George W. Houk Co. (Licensed Under Rudge-Whitworth)



Electric
Starting-Lighting
Systems

EFFICIENT, SIMPLE, RELIABLE

Jones Electric Starter Company
 Jackson Blvd. and Loomis St., Chicago, Ill.
 DETROIT OFFICE: 1211 Woodward Ave.



COMPLETE THRUST BEARING
The Star Ball Retainer Co.
 Lancaster, Pa., U.S.A.

Manufacturers of Radial Ball Retainers, Thrust Ball Retainers, Complete Thrust Bearings

Corcoran

Lamps

GAS, OIL, AND ELECTRIC

CORCORAN LAMP CO.
 CINCINNATI, O.

Send for This Catalog Today



It will save you money, time
and increase the enjoyment
of motoring or motorboating.

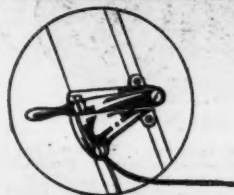
WESTERN ELECTRIC COMPANY

Manufacturers of the 7,000,000 "Bell" Telephones

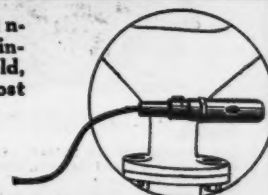
New York	Chicago	Kansas City	San Francisco	Montreal	London
Buffalo	Milwaukee	Oklahoma City	Oakland	Toronto	Berlin
Philadelphia	Pittsburgh	Minneapolis	Los Angeles	Winnipeg	Paris
Boston	Cleveland	St. Paul	Dallas	Calgary	Rome
Richmond	Cincinnati	Denver	Houston	Vancouver	Johannesburg
Atlanta	Indianapolis	Omaha	Seattle	Edmonton	Sydney
Savannah	St. Louis	Salt Lake City	Portland	Antwerp	Tokyo

EQUIPMENT FOR EVERY ELECTRICAL NEED

Two to Ten Miles More on a gallon of gasoline



Handy in-
stalled on in-
take manifold,
steering post
control.



Guaranteed to give perfect satisfaction.

Handy Carburetion Controller and Gasoline Savers increase your gasoline mileage 2 to 10 miles on every gallon, depending on the size of the car. They do it by automatically regulating the mixture of gasoline and air to the exact proportions needed. 95% of the time your motor will run faster and develop more power on a much leaner mixture than it is practical to adjust your carburetor for.

The Handy is an automatic auxiliary air valve attached to the intake manifold between the carburetor and cylinders of the motor. It automatically supplies auxiliary air, reducing the suction at the gasoline jet of the carburetor, giving your motor more air and less gasoline without touching the carburetor adjustments.

The Handy is automatic, requiring but little attention from the driver, and is easily turned off and on.

Try one thirty days on your own motor. If you are not perfectly satisfied your money will be refunded. Order one from your dealer; if he hasn't it, write direct, giving dealer's name.

Handy Controller, \$7.50; Junior, \$5.00.

By Express or Parcels Post, prepaid.

The Cray Company

655 Woodward Ave., Detroit, Mich.

Chicago, Ill., 718-719 Michigan Blvd. Bldg.; Kansas City, Mo., 518 New Nelson Bldg.; Los Angeles, Cal., 324 Central Bldg.; New York, N. Y., 128 Maiden Lane; Canadian Distributor, L. W. Fraser & Company, Windsor, Ont.

TOURING CAR
\$850

SPEEDSTER
\$750

The Vulcan 27
"The World's Greatest Light Car"

1914 is to be the year of the Light Car — the low upkeep car — the VULCAN.

Send for catalog and generous dealers' proposition
VULCAN MFG. CO., Painesville, Ohio Lock Box MA477

CONNECTICUT

Master Vibrator
For Ford Cars

A dependable master vibrator at a reasonable price. Makes starting easy—motoring becomes a pleasure.

Flush Type—Price \$9.00.
Delivered upon receipt of price
Send for Bulletin No. 36

Connecticut Tel. and Electric Company, Inc., Meriden, Conn.



Make Your
Truck
Earn More

If you have a long haul, you can deliver twice as much or more material per trip by using the Troy Trailer.

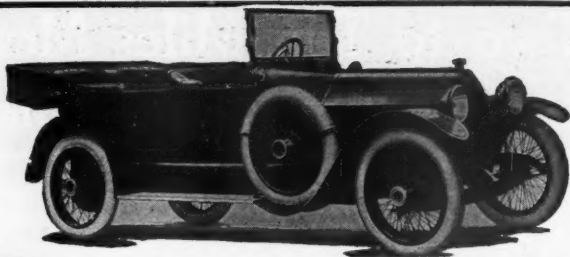
If you have a short haul, Troy Trailers will eliminate the time lost in loading and unloading.

You ought to have our Trailer Bulletin M. It's worth while—write for it.

The Troy Wagon Works Company

Clay Street

Troy, Miami County, Ohio



BENHAM SIX

Continental 6 P motor, 48 H. P. Bosch Ignition. Brown-Lipe 4 speed forward transmission. Spicer Universal joints. Timken full floating rear axle. Timken front axle with Empico speedometer drive. Timken bearings throughout. Long radiator. One man top. Gemmer steering gear. Left drive, center control. Goodrich tires, 34 x 4 1/2. Electric starting, generating and lighting. 130-inch wheelbase. 3,600 lbs.

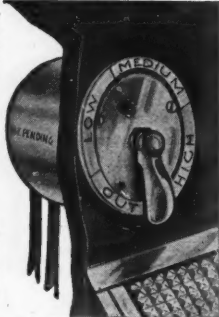
Two pass., \$2485; Five pass., \$2485; Seven pass., \$2535
BENHAM MFG. CO., Detroit, Mich.

CHANEY AUTOMOBILE HEADLIGHT DIMMER

Blinding headlight glare is a menace. Safeguard yourself and others from accidents by attaching a CHANEY Headlight Dimmer.

**Guaranteed
10
Years**

The satisfaction of one accident averted will repay you many times over for the small cost of the CHANEY. The CHANEY dims the glare of the most powerful lights.



It enables you to graduate the intensity of your light to High, Medium or Low. You may discontinue the use of your side lights if desired.

**Price, \$3.50
Complete**

**Direct on Receipt
of Price**

The CHANEY Dimmer in 10 minutes can be placed on any car by anyone. Easily adjusted by slight kick of foot.

L. F. CHANEY COMPANY
SPRINGFIELD, OHIO
DEALERS AND AGENTS WANTED EVERYWHERE

THE RUTENBER MOTOR

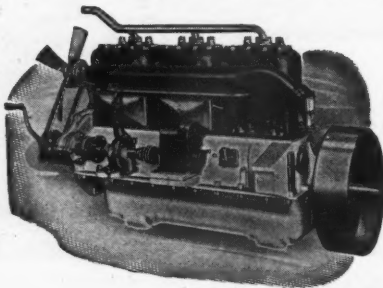
MANUFACTURED SINCE 1901 FOR HIGH GRADE
AUTOMOBILES AND TRUCKS

3 1/2 x 5 1/2 four and six cyl.
4 1/2 x 5 1/2 four cylinder
Standard or Unit
and

4 x 4 and 4 1/2 x 5 1/2 standard
types, all L head, 4 cycle

Manufacturers are invited to investigate our service and our facilities. Literature on request

**The Rutenber
Motor Company**
Marion, Indiana



Hupmobile

"32" Touring Car, fully equipped.....\$1050
"32" Roadster, fully equipped.....\$1050
"32" Touring Car or Roadster with Westinghouse two-unit electric generator and starter; electric lights; over-size tires 33x4 inches; demountable rims, extra tire carrier at rear.....\$1200
Coupe.....\$1350 Delivery Wagon.....\$1075

All prices F. O. B. Detroit

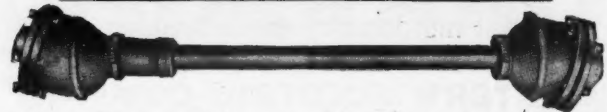
HUPP MOTOR CAR COMPANY
1228 Milwaukee Avenue Detroit, Michigan

*Remember
To Specify
Detroit Springs
On your next car
for Safety
Comfort
Economy*

Look for
This
Trade Mark

RESILIENT
**Detroit
Springs**
SILENT TRADE MARK SELF-LUBRICATING

Spicer Universal Joints



Universally Accepted as the Most Dependable Flexible Connection Known to Motor Car Practice

Oil-Tight PARTS INTERCHANGEABLE Dust-Proof
SPICER MANUFACTURING CO., Plainfield, N. J.

Sales Representatives:
K. Franklin Peterson, 122 S. Michigan Blvd., Chicago.
L. D. Bolton, 2215 Dime Savings Bank Bldg., Detroit
Thomas J. Wetzels, 29 W. 42d St., New York
Foreign: Benjamin Whittaker, 21 State Street, New York

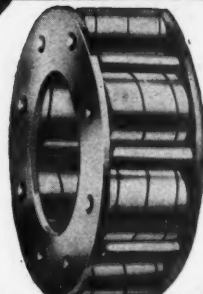
Lexington "Four" \$1335

You'll sell yourself a Lexington "Four" or a Howard "Six" when you learn what kind of men make these cars. Let us send you full particulars.

**THE
LEXINGTON-HOWARD CO.**
120 Main Street
Connersville, Indiana, U. S. A.

HOWARD
"Six" \$2375

Hyatt Quiet Bearings



Lead the world in quantity of production. Twelve mammoth factory buildings required to supply the demand.

SERVICE STATIONS

756 Woodward Ave.....Detroit, Mich.
1120 Michigan Ave.....Chicago, Ill.
4th & Middlesex Aves.....Harrison, N. J.
169 Massachusetts Ave.....Boston, Mass.
800 Hennepin Ave.....Minneapolis, Minn.

HYATT ROLLER BEARING CO.
DETROIT, CHICAGO
NEWARK, N. J.

FEDDERS RADIATORS



Fedders Manufacturing Co., Inc.

Buffalo = = = N. Y.

Ask the agents for Haynes Cars
what they think of the

LEECE-NEVILLE

STARTING and LIGHTING SYSTEM

They know what service the system
gives on Haynes Cars—just ask them.

The Leece-Neville Company
1059 Power Avenue CLEVELAND, O.

(31)



Firestone

Non-Skid
Smooth Tread Tires

Firestone Non-Skid protection is
ample security against any emergency
of road or weather.

Firestone Quick Detachable, De-
mountable Rims prolong tire-life and
prevent delay and mishap.

All-round Firestone equipment is
the one positive way to insure Most
Miles per Dollar, with riding comfort
and safety.

The Firestone Tire & Rubber Co.
Akron, O.—All Large Cities

Republic Trucks

2000
Pounds
Capacity



\$1350
(Chassis
only)

2000 lb. REPUBLIC TRUCK WITH EXPRESS BODY

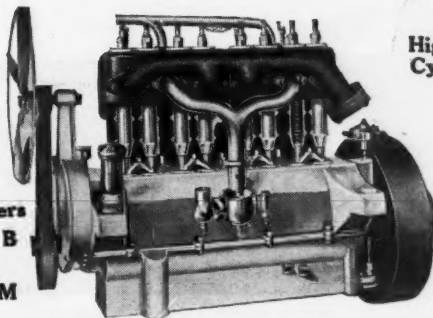
Alma Motor Truck Company

Sales Office: 890 Woodward Ave., Detroit, Mich.
Factories, ALMA, MICH. Service Stations, EVERYWHERE

Brennan Standard High Grade Motors

Large
Bearings
Long
Stroke
4 and 6
Cylinder

Our leaders
MODEL B
4½x5
MODEL M
4x5



High Grade 4
Cycle Motors

FOR

Elmore Cars,
Warren, Cor-
bin, White
Steam Cars
and standard
makes of cars
and trucks,
also trans-
mission gears.

4 Cyl., 5x5, 40 H. P., 4 Cyl., 4½x5, 35 H. P.

BRENNAN MOTOR MFG. CO., Syracuse, N.Y.

SOONER OR LATER

you will ride on



WHY NOT NOW?

Dealers write for prices and discounts

The Essenkay Products Company

1127 W. 37th St.,

CHICAGO

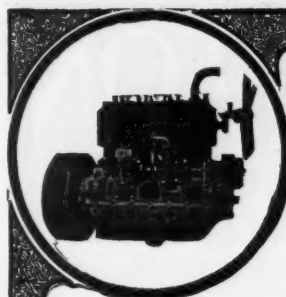
HAM'S

WRITE FOR

Steel MOTOR TRUCK LAMPS

C.T. Ham Mfg. Co., Rochester, N.Y.

CATALOGS
PRICES
DISCOUNTS



Continental Motors

4 and 6 Cylinder Types

Not made to meet a price,
nor to shatter records of
quantity, but to fulfill a
service ideal—
to be a true

foundation for a worthy motor vehicle.

Continental Motor Mfg. Co.
Detroit, Mich.

Factory Representative, E. F. Peterson, 122 S. Mich. Ave., Chicago



Polarine

FRICITION REDUCING MOTOR OIL

Maintains the correct lubricating body at any motor speed or heat

STANDARD OIL COMPANY
(AN INDIANA CORPORATION)

STEADY AND SURE

In road races and daily service Wisconsin Motors have established a wonderful record for efficiency and endurance. They start easily, run steadily and are always under perfect control.

Wisconsin
CONSISTENT

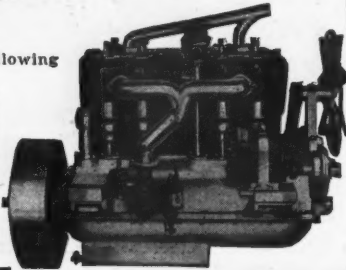
MOTORS

Write for catalog describing following sizes:

3 1/4 x 5"	.....4 Cyl. Enbloc
4 x 5"	.....4 Cyl. Enbloc
4 1/4 x 5"	.....4 Cyl. T Head
4 3/4 x 5 1/4"	.....4 Cyl. T Head
5 1/4 x 7"	.....4 Cyl. T Head
3 1/4 x 5 1/4"	.....6 Cyl. Enbloc
4 x 5"	.....6 Cyl. Three Enbloc
4 1/4 x 5"	.....6 Cyl. T Head
5 1/4 x 7"	.....6 Cyl. T Head

Wisconsin Motor Mfg. Co.
Dept. 25, Milwaukee, Wis., U.S.A.

Mechanically perfect—Long diameter crank shaft—Automatic self-contained oiling system—Extra large bearings



UNIVERSAL VULCANIZER

Tire Cuts Ruin Casings
They admit moisture to the carcass, cause the fabric to rot and weaken, grow larger—end in blowouts. You can repair casings and inner tubes anywhere in 15 minutes, good as a repair shop can do—and for one cent.

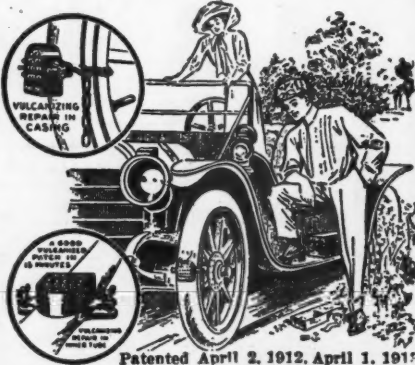
A Practical Vulcanizing Outfit Complete, with enough repair gum to make thirty patches. Weighs 3 pounds, can be carried in tool box.

Price complete, \$8.50

Ready for Instant Use. At your dealers, or we will send it prepaid. Guaranteed satisfactory or money refunded.

ADAMSON MFG. CO.,

Patented April 2, 1912, April 1, 1915
East Palestine, Ohio



KINGSTON CARBURETOR

Save Money by Economizing Gasoline

Four floating bronze ball valves opening automatically under different motor suction supply a uniform mixture at any speed, regardless of hot, cold, wet or dry weather.

Write for details and let us tell you why so many manufacturers are adopting this carburetor as standard equipment

Made by the oldest manufacturers of carburetors in America
ESTABLISHED 1895

BYRNE, KINGSTON & COMPANY, Kokomo, Ind.

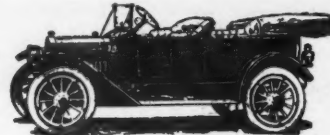
Coxajusto
ADJUSTABLE TO ANY LOAD

Shock absorbers have an adjustment cap at the base. Turning this cap adjusts the tension of the tapered helical spring to the load. A simple twist of the wrist—that's all. Comfort and saving on repair bills assured. It's the only adjustable spring shock absorber made.

Send for Folder today. Address Dept. A

Cox Brass Mfg. Co., Est. Albany, N. Y.

1777 Broadway, New York City. 2637 Michigan Ave., Chicago, Ill. 809 Boylston St., Boston, Mass. 870 Woodward Ave., Detroit, Mich. 1216 Van Ness Ave., San Francisco, Calif. Export Representative, Auto Supplies Export Co., 1779 Broadway, New York City.



NOW
\$900

EMPIRE

"The Little Aristocrat"

Completely
Equipped

New Series Model 31, 110 Inch Wheel Base

A larger, more beautiful car, with every luxury and equipment. Increased production brings the price down to \$900.

With Remy Electric Starting and Lighting System \$1025

Advance catalogue with complete details is ready

Get a copy of the illustrated story of the Transcontinental Empire. Forty pictures.

EMPIRE AUTOMOBILE COMPANY, Indianapolis, U. S. A.



THINK THOUSANDS OF MILES
AHEAD, AND YOU WILL BUY
REPUBLIC MILEAGE
PLAIN AND STAGGARD TREAD
TIRES

THE REPUBLIC RUBBER CO.
YOUNGSTOWN, OHIO.

BRANCHES AND AGENCIES IN THE PRINCIPAL CITIES.

SHELDON

AXLES & SPRINGS
ARE
INVINCIBLE

THE SHELDON AXLE CO.
WILKES-BARRE, PA.

CHICAGO OFFICE.
68 East 12th Street.

DETROIT OFFICE
1215 Woodward Ave

PERFECT CARBON REMOVER \$10



Will remove all carbon from cylinders. Easily and in a few minutes. Equal of any high-priced outfit. All parts guaranteed. Keeps up efficiency of cars and trucks. Big money maker for garages.

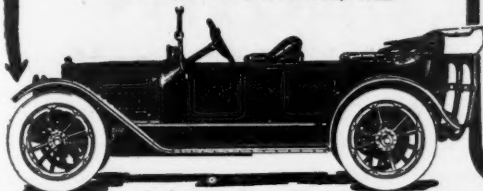
To large garages, Oxygen tanks of 100 and 200 cubic ft. capacity are loaned. To small consumers a tank of 50 cubic ft. is sold for \$18—thus making the price of the complete outfit \$23. 50 cubic ft. of Oxygen will clean 15 to 20 cylinders. Oxygen costs from two to two and one-half cents per cubic ft. Discounts made to no one.

OXYGEN DECARBONIZER CO., 301 River St., Troy, N. Y.

KISSEL KAR

The Car of Comfort

You will enjoy the silent, luxurious comfort of the KisselKar. Extra liberal wheelbase, big wheels and tires, shock absorbers and 11 inches of seat upholstery absorb road vibration—the deep pitched seats and roomy tonneau enable you to relax restfully. Ask for illustrated catalog. KISSEL MOTOR CAR CO., 121 Kissel Ave., Hartford, Wis.



Three Perfect Models

60 "Six" \$3150

48 "Six" \$2350

40 "Four" \$1850

\$2400

Completely Equipped

MOLINE KNIGHT

Four-cylinder, five-passenger, 50 horsepower, 128-in. wheelbase.

More Power
More Flexibility
More Economy
More Silence

Bosch ignition, Wagner electric starting and lighting, \$2400.

The car of the future will not have poppet valves

Moline Automobile Co., East Moline, Ill.



Steel Protectors

Each section 2 in. wide, $\frac{1}{8}$ in. thick. They hook to rim. As flexible as ever. Anti-Skid, Can't Blowout or Rim Cut.

How can the rubber wear off if it is covered with steel?

Try 2 or 3 sections over any old blowout

Special prices to the first in new territory

Kimball Tire Case Co., 173 Hwy., Council Bluffs, Ia.



Tire covered complete

"Pass Them All"

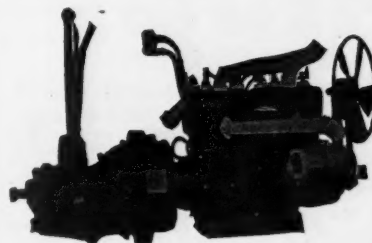
KNOX

BEST BY TEST

Motor Cars

Send for Pleasure or Commercial Catalogue
KNOX AUTO CO., SPRINGFIELD, MASS.

Motors G-B&S Motors



We beg to announce our latest four cylinder Unit Power Plant.

This Motor includes the recognized engineering practice, here and abroad.

"Craftsmanship of long experience is the result of this distinctive Power Plant."

Detailed information on request, and we are in a position to make prompt deliveries according to contract.

GOLDEN, BELKNAP & SWARTZ CO.
DETROIT, MICH.

You can take a thousand miles of service out of a set of tires by driving them insufficiently inflated over ten miles of road.

Use the New Positive Lock Stop

TWITCHELL AIR GAUGE

and save your tires



"TIRE INSURANCE FOR \$1.00"

Simple, Accurate, Durable and Easily Read

For sale by Jobbers, Dealers, Garages, or

The Twitchell Gauge Co.

1201 Michigan Avenue

Chicago, Illinois

COLE

The Standardized Car

The car that started the stampede to standardization

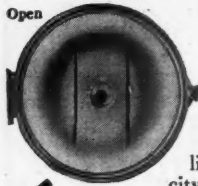
A Cole franchise is a valuable asset to any dealer. Find out about it.



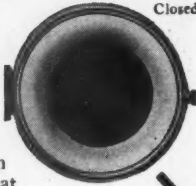
Cole Motor Car Co. of Indianapolis

Keep Your Searchlights Lighted in the City and Fulfill the Law

Open



Closed



This simple electric attachment, controlled by a push button, changes your lamps instantly from full searchlights to perfect broad beam city driving lights without that dazzle which the law forbids.

NODAZ Adds Immeasurably to the Safety and Comfort of Driving at Night

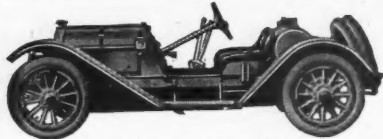
An economy—Lessens your risk in city and country—You avoid glass and all other obstacles in the streets. Your local dealer can supply you and equip your lights for double service.

Send post card for Free Folder.

WARD LEONARD ELECTRIC CO., Bronxville, New York

MERCER

AMERICA'S FIRST GRAND PRIZE WINNER



Series J—Raceabout

The remarkable endurance of Mercer raceabouts is not accidental. It is the result of conscientious attention to even the slightest detail of manufacture.

Send for Catalogue

MERCER AUTOMOBILE CO. 500 Whitehead Road
TRENTON, N. J.

PAIGE

Model "36" \$1275.00

A car whose design and construction is so far ahead of others at its price that it is in a class all its own. Gray and Davis Electric starting and lighting equipment, silent chain cam shaft drive, four inch by five inch motor, cork insert multiple disc clutch, 116 inch wheel base, left side drive, center control, and equipment complete to the last detail.

Model "25" \$975.00

Including Electric Starting and Lighting System

This model has made the Paige reputation. Such a sturdy, powerful, comfortable car has never been offered the public at anywhere near its price. \$975.00 with complete equipment.

Splendid Agency Proposition

Paige-Detroit Motor Car Co., 304 Twenty-First St., Detroit, Mich.



Established Agents
Solicited

Braender Tires & Tubes

SERVICE and SATISFACTION

The Only set of Tires to complete the entire 500-mile race at Indianapolis, May 30, 1913. Consider that 88 Tires of other makes were changed in this Race. Our "Victory Folder" explains other races.

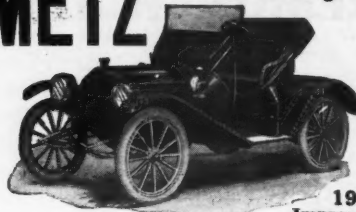
Braender Rubber & Tire Co.

Main Office & Factory Rutherford, N. J.
New York, 1937 B'way. Chicago, The Alfredal Co. Boston, Dayton Tire Co. Pittsburg, Keystone Motor Supply Co. Indianapolis, Brant Bros. Columbus, O., Franklin Rubber Co. Troy, N. Y., G. H. Snyder. Newark, N. J., Ketcham & Lawrie.

METZ "Twenty-Two" Roadster

THE GEARLESS CAR

"No clutch to slip—no gears to strip."



\$475

1914 Improvements Completely Equipped

Center control, left-hand drive, 4-cylinder 22½ H. P. water-cooled motor, Bosch magneto, standard artillery wheels, best quality clincher tires, extension top, windshield, five lamps, gas generator, tools, etc. Makes 5 to 50 miles per hour on the high speed, 28 to 32 miles on 1 gallon of gasoline, and is a wonderful hill climber. A strong, reliable, stylish, fully guaranteed car. You can secure EXCLUSIVE SALE in your territory. Write at once for Book "K" and particulars.

METZ COMPANY

WALTHAM, MASS., U. S. A.

Inter-State BULLETIN

No. 2 will appear in Motor Age on May 21

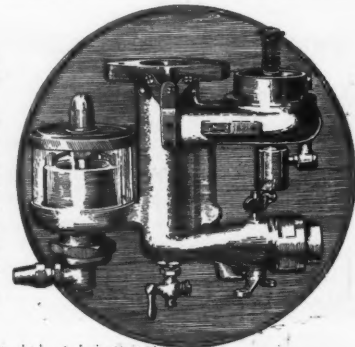
WATCH FOR IT!

Or write us today for advance proof

INTER-STATE MOTOR COMPANY

Dept. C, Muncie, Indiana

More 1914 pleasure car and commercial car models are equipped with STROMBERG Carburetors than with any other make of carburetor.



A STROMBERG under the hood is the hall mark of a QUALITY car.

Write for free booklet containing "Reasons Why."

"The Accepted Standard"

Stromberg Motor Devices Company, 54 East 25th St. Chicago, Ill.

The Searchlight Gas Co.

1016 Karpen Building

CHICAGO, ILLINOIS

Stronger than ever, legally, financially and in the esteem of the trade. Watch us grow.

BRANCHES AND REFILLING STATIONS:

Warren, Ohio
Chicago, Ill.
Detroit, Mich.
Camden, N. J.
Philadelphia, Pa.
Kansas City, Mo.

San Francisco, Calif.
Buffalo, N. Y.
Atlanta, Ga.
Dallas, Tex.
San Antonio, Tex.
Boston, Mass.

Los Angeles, Calif.
New York City
Syracuse, N. Y.
Minneapolis, Minn.
Toronto, Canada
Indianapolis, Ind.

THE RICHARD



96 Horse Power

80 Miles an Hour

Rated at 25 horse power—develops 96 horse power. Four cylinders, 4 inch bore, and 8 13/16 inch stroke; 7 passenger; \$1,850, fully equipped.

Live Dealers Wanted

WRITE FOR OUR PROPOSITION

THE RICHARD AUTO MFG. CO., 1032 ENGINEERS BLDG., CLEVELAND, OHIO

"Bridgeport"

TRADE MARK

TIRE PUMPS

Are easy to use and easy to sell. They are durable and efficient—and are widely advertised. The cylinders are of seamless brass tubing which cannot rust. The "Stapley," the "Aeolus," "Windjammer," etc., give lasting satisfaction. Carry them in stock.

Bridgeport Brass Company
P. O. Box A Bridgeport, Conn.

SMOOTH—QUIET—POWERFUL
Model 7, \$1250
Other Models \$1600, \$1700, \$1900, \$2000
Write for full particulars and catalogue
Cartercar Company Pontiac Michigan

Electricity Shifts the Gears on the
HAYNES
"America's First Car"
Two "sixes" and a "four." Roadsters, touring and enclosed body cars.
Catalog covering this season's models upon request.
Haynes Steering Wheel Showing Selector Switch
The Haynes Automobile Co., 2 Main St., Kokomo, Ind.

Wizard Motors

Measure up to every

standard of efficiency

As a chain is no stronger than its weakest link, so a cyclecar is no better than its power plant.

Wizard Twin Motors are designed especially for cyclecar requirements and are capable of furnishing power and speed to meet every demand that could ever be made on them.

Get acquainted with the Wizard
Write for catalog

The Wizard Motor Co. Indianapolis, Indiana

WINTON SIX

Here is Genuine Comfort

The Winton Six motor is the last word in automobile power plants. It is the only motor on the market today that, in a single model, has been undergoing a straight-forward development toward perfection for more than seven years. Designed by Alexander Winton, the world's foremost six-cylinder specialist.

Equipped with this superb motor, the Winton Six is easily the most restful riding car that travels American roads. Send for 64-page catalog.

THE WINTON MOTOR CAR COMPANY
424 Berea Road, Cleveland, O.

World's First Maker of Sixes Exclusively

Dayton Airless Tires

IMPORTANT NOTICE

When you order Dayton Airless Tires give the exact weight of car or the make and model.

Each size of these tires is made in several carrying capacities. This permits us to suit the riding quality to the weight of your car. This great advantage is found in no other tire. Attention to this detail will give you comfortable service and economy.

The Dayton Rubber Mfg. Co.
1005 Kiser St., Dayton, Ohio.

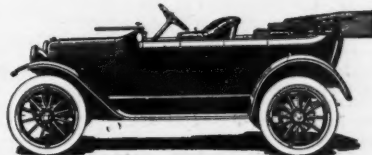
NEW YORK
Retail Branch
1851 Broadway

CINCINNATI
Retail Branch
1932 W. 8th St.

CHICAGO
Retail Branch
2123 Michigan Ave.

The **Detroit** — A Complete Line
\$950 to \$1050

Five
Passenger
Touring
Car



32 H. P.
Long
Stroke
Motor

Enclosed Valves, Three Point Suspension, Unit Power Plant, Platform Rear Springs, Full Floating Rear Axle, Left Hand Drive, Center Control, Drop Frame, Large Tires, Complete Ball Bearing Cars.

BRIGGS-DETROITER COMPANY, 455 HOLBROOK AVE., DETROIT, MICH.

WRITE FOR SPECIFICATIONS

The Clearing House

of the Motor Car Industry

For Second Hand Cars Surplus Parts, Accessories, Tires, Machinery & all other Special Announcements of a Similar Character.

CARS FOR SALE

FOR SALE

New 35 Studebaker; never run; \$1050; quitting the agency.

D. OGDEN,
Columbus, Ind.

MR. DEALER!

Here Is a "Chance of Your Lifetime"

1500 Lb. SAMPSON TRUCKS

—AT—

1/2 PRICE

WE STILL HAVE A LIMITED NUMBER OF THESE TRUCKS LEFT—SOME WITH EXPRESS BODY, SOME WITH OPEN SCREEN BODY AND OTHERS WITH PANEL TOP BODIES.

Regular Price \$1400

OUR PRICE \$700

REMEMBER THESE ARE ABSOLUTELY NEW TRUCKS AND ARE STRICTLY GUARANTEED. THEY ARE WITHOUT DOUBT THE GREATEST VALUE EVER OFFERED TO THE AMERICAN PUBLIC. DO NOT MISS THIS WONDERFUL OPPORTUNITY. IT IS THE

Chance of a Lifetime

WE ARE THE

World's Largest Dealers

—IN—

New and Used Automobiles, Motor Trucks and Accessories.

We have just issued our "PRICE WRECKER, NO. 4"—THE NEW GREAT MONEY SAVER—Write for it. FREE.

Headquarters for Bosch Magnetos, Lamps, Lighting Systems, Axles, Radiators, Horns, Tires, &c.

Times Square Automobile Co.

WORLD'S LARGEST DEALERS

56th Street & Broadway, N. Y.
1210 MICHIGAN AVENUE, CHICAGO

Mitchells, Rebuilt, Guaranteed

These cars are fully equipped. Call or write for further particulars.

MITCHELL AUTOMOBILE CO.,
2334-36-38 Michigan Ave., Chicago

Specially Made for the Indianapolis Track Race Prize Winner

90 miles per hour, special racing machine\$3500
70 miles per hour, G. J. G. speedster 1275

G. J. G. MOTOR CAR COMPANY
WHITE PLAINS, N. Y.

STEARNS, 30-60, OVERHAULED and repainted, demountable rims, up-to-date in every respect.

CONDON,

2635 Wabash Ave., Chicago.

Usually We Have a Great Variety

of different makes and types of used cars. Some are practically new and have all the latest improvements; some have none of the frills, but are good, serviceable machines.

The Difference Is Mainly in the Price

Ask for our bulletin giving prices.

PACKARD MOTOR CAR COMPANY OF CHICAGO
2367 MICHIGAN AVE.

1—1913 Franklin 5 passenger Model M. (Little Six).

1—1913 Chalmers 5 passenger Model 36-4.

1—1910 Vello 5 passenger Model 30-4.

1—1912 Chalmers 4 passenger Model M-30.

1—1913 Studebaker Six, 7 passenger 40 H. P.

All above cars are in A-1 condition, nice as new. Write for prices.

LOGAN CARRIAGE & AUTO CO.
Parkersburg, W. Va.

COMMERCIAL COLLECTIONS

NEW YORK DETROIT BOSTON

ADOLPH M. SCHWARZ

ATTORNEY AT LAW

Commercial Collections Everywhere

First National Bank Building

CHICAGO, ILL.

Telephones Central 6435, 6436, 6437

Jesse A. Joseph, Att'y at Law, Manager

References: The leading manufacturers of motor car accessories, parts and supplies

—Ask for our "AUTO FOLDER"—

CYCLE CAR ACCESSORIES

CYCLE CAR PARTS

Motors, Stearings Gears, Transmissions, Frames, Rear Axles.

—Catalogues Free—

PALMER BROS.,

Cos Cob,

Connecticut

STEERING KNUCKLES, YOKES,
front axles, springs, wheels, gear or friction transmissions.

MINNEAPOLIS MOTOR CO., AGENCY
1123 Michigan Ave., Chicago

V-Pulleys 1 1/4 x 7, also flat belt pulleys 2 x 7

F. MACVICAR,

214 Milton Avenue Syracuse, N. Y.

MAGNETOS

ALL MAKES OF MAGNETOS AND COILS repaired, bought, sold and exchanged. Service station for Simms, Michigan and National. Mail orders given special attention. Get our prices before going elsewhere. **HECHT MAGNETO EXCHANGE, 228 West 49th Street, New York.**

MAGNETOS

Repaired, remagnetized; prompt service on all makes.

Get our exchange proposition on new K-W for old equipment.

Spark Coil, Storage Battery and Carburetor Repairs.

Northwestern Distributors.

K-W magnetos, Schebler carburetors. Vesta lighting equipments.

Kellogg Self Starters and Tire Inflators.

REINHARD BROTHERS CO.,
Minneapolis, Minn.

MAGNETOS EXCHANGED

Bought and sold. We repair any make of magnetos and coils. **FORD MAGNETO CO., 2616 Locust St., St. Louis, Mo.**

Telephones: Bomont 65, Central 9570L.

MAGNETOS

We have 2,000 Model X Splittorf Magnetos; new price, without coil, \$17.50 each; with coil, \$25.00 each. The regular price for these is \$75.00. We also have other makes of magnetos at cut prices—in fact, everything for the automobile. Send for "OUR PRICE WRECKER"—the greatest money saver in the world.

TIMES SQUARE AUTO CO.

1210 MICHIGAN BLVD., CHICAGO, ILL.
S. W. Cor. 56th St. & Broadway, N. Y. City

MAILING LISTS

A COMPLETE LIST OF

Auto Dealers—20,572—\$30 or \$3 per M by states. Complete list of Ford Dealers—5,150—price \$15 or \$4 per M.

Garages—13,515—\$25 or \$3 per M by states.

Repairs—8,466—\$15 or \$3 per M by states.

Supplies—6,964—\$12 or \$3 per M by states.

Auto Mfrs., U. S. and Canada—626—\$3.

544 Auto Dealers, second-hand—\$4.00.

14,000 Auto Truck Owners—\$3.50 per M.

AUTO OWNERS in majority of states is \$2 per M. In lots of 1 to 10 M. Larger lots price is interesting.

7,500 auto owners in Canada, \$4.00 per M.

FORD OWNERS in most states is \$3 per M; some states price is higher.

Can furnish Automobile Dealers any make of car.

WRITE US YOUR NEEDS

All dealers, garages, supplies, manufacturers and repairs are typewritten and show financial rating

TRADE CIRCULAR ADDRESSING CO.,

166 West Adams St. Chicago, Ill.
Phone: Franklin 1183

COLORADO MOTOR REGISTRATIONS.

First lists available under new law. Automobile registrations furnished weekly during entire year 1914 for \$60. Also have dealers and motorcycles. **E. K. MERRITT, 1560 Race St., Denver, Colo.**

GET LIST OF AUTOMOBILE REGISTRATIONS

direct from State House. Quickest & best daily service. \$45 for entire year, or at rate of \$4 per month. Special lists of all kinds promptly compiled. **DONNELLY, Box 180, Albany, N. Y.**

KENTUCKY, TENNESSEE, GEORGIA AUTO REGISTRATIONS

furnished \$10.00 per month, three States, ready about 10th each month. Can also furnish complete list to date cheap **W. P. ALLEN, Usona Bldg., Fulton, Kentucky**

MAILING LISTS AND STATISTICS.

Owners or dealers; any state, county, city; weekly and monthly supplements at lowest prices. Special lists of electrica, trucks, Fords, Studebaker, Overland, etc. **MOTOR LIST CO. OF AMERICA, 220 News Arcade, Des Moines, Iowa.**

The Clearing House—continued

New Jersey Auto Registrations
Send for sample page and get list from reliable party right in Trenton. Daily service only \$80 for entire year 1914. H. J. Tindall
47 W. State St., Trenton, N. J.

**NORTH CAROLINA
AUTOMOBILE OWNERS**
Up-to-date lists. 12,000 names, \$15. Address
Address W., Box 426 Raleigh, N. C.

Weekly List of 1914 N. E. Car Owners
\$10.00 yearly. Price of Mass. list, classified by cities and town, on application.
AUTO LIST PUBLISHING CO.
188 Pearl Street, Boston

MOTORIST'S BOOKS

A Big Field for Accessories

Over 200,000 motorcycles require horns, lamps, tires, speedometers, batteries, spark-plugs and many other things which automobile accessory manufacturers can furnish. Send for sample copy and advertising rates and reach this field through BICYCLING WORLD & Motorcycle Review.

289 W. 39th St., New York.

A. L. DYKE'S AUTO INSTRUCTION. A new idea of instructing you with working models to care for and repair automobiles. Simplified instruction on self-starters and lighting just added. Send for free 32-page illustrated booklet. A. L. Dyke, Box 16, Roe Bldg., St. Louis, Mo.

Ford Model T Reference Book

Second edition. A manual on care, repair and operation. Makes you master and mechanic of Ford Model T. Details dismantling and assembling of its mechanical parts. Troubles located and readily remedied by digest index. Circular on request, or sent post-paid, \$1.00.

FORD REFERENCE BOOK CO.,
57 W. 125th St., New York, N. Y.

Parts and Accessory Makers.

The motorcycle field is well worth your attention; 75,000 new machines in 1912. Leading medium.

Motorcycle Illustrated,
51 Chambers Street, New York City
Paid circulation over 8,600.

THE PRACTICAL HAND BOOK
of Gas, Oil and Steam Engines.
Send for complete circular.
CHARLES C. THOMPSON CO.
1130 S. Wabash Ave., Chicago, Ill.

PARTS AND ACCESSORIES FOR SALE

A A A Tops, Cushions or Trimmings
New or recovered. Curtains, new lights in curtains, carpet rugs, etc.
NEWTON & SON, 120 Elm St., Cortland, N. Y.

Accelerator or Foot Throttle
for Ford Cars. Fits regular equipment. Agents and dealers wanted. Price \$3.00. Send for circular.

MILLER P. JONES
6042 Union Ave., Chicago

ACCESSORY CATALOG
Mailed on request. Dealers, send list of wants for special prices. Westchester cup grease bbl. lots 4c pound. **WESTCHESTER ACCESSORIES CO., 1777 Broadway, New York City.**

A GOOD WHITE STEAMER ENGINE
Generator and Burner and several other good parts cheap.

Address BOX E 20, Care Motor Age

ANNOUNCEMENT

Ford Owners

Free Ford and Regular Catalogs

We sell every accessory for the Ford Car that you find in Motor Age.

WRITE US WHAT YOU WANT
AND GET OUR PRICE

CONSUMERS AUTO SUPPLY CO.
DEPT. F., 123 W. MADISON ST., CHICAGO.

Accessories

Money-Savers

High Grade Auto Supplies at a Saving of
25 to 100 Per Cent

Wind Shields, 30 Cents on the Dollar

Zig-zag or rain vision, also clear vision. Single or double section; black, brass or nickel. All brand new and of the best material and workmanship. Guaranteed to be exactly as represented. Money back if not satisfied.

Tops

New Flanders "20" Touring Car Tops; best mohair; complete with side and storm curtains; can be made to fit Buick "10" touring cars.

Price, \$11.85

Get Our Prices Before Buying Elsewhere

ERWIN GREER & COMPANY,

1456-64 Wabash Ave.

Chicago, Ill.

Accessory Department.

"AMERICAN"

Motor Car Owners

The entire stock of repair parts, together with all drawings, jigs, patterns, special tools and records have been purchased by us. Service will be continued from the American Motors Company factory, 1959 S. Meridian St., Indianapolis, Ind.

American Motors Parts Co.

1959 S. Meridian St.

INDIANAPOLIS, IND.

American Underslung and Marion

Motor car parts and service.

CHARLES E. RIESS & CO., Inc.

1690 Broadway, New York

ATTENTION AUTO OWNERS!

Auto Tops Built and Repaired, seat and Top Covers made by sending old ones for pattern. We make for 1913-1914 Ford Touring Cars, Slip Covers, covering all leather on car, together with top cover to match. Price, \$14.75. Roadster, \$9.25. Studebaker, Herr Brooks, Overland, Buick and Maxwell owners, write for samples and prices. Discount to dealers. Money back if not satisfactory. **INDIANA AUTO TRIMMING CO., 216 No. Mich. St., South Bend, Ind.**

Accessories

Annular Ball Bearings Reground

We carry a complete stock of reground bearings of all makes and sizes, for immediate exchange.

GET OUR PRICES

Ahlberg Bearing Co.,

2640 Michigan Avenue

CHICAGO, ILLINOIS

1790 Broadway
New York City

806 Woodward Ave.
Detroit, Mich.

93 Massachusetts Ave., Boston, Mass.

ATTENTION, HENRY OWNERS

We are prepared to fill orders promptly for repairs for Henry Cars.

MUSKEGON AUTOMOBILE CO.
Muskegon, Mich.

Automobile Bodies

All kinds of special work, single bodies or quantity orders. Ford closed bodies, coupe, sedan and cabriolet. Ford delivery bodies. Prompt shipment on fore doors.

PAUL MURRAY

1201 State Life Bldg., Indianapolis, Ind.

AUTO PARTS & ACCESSORIES

Motors, Frames, Transmissions, Axles, etc. Gears of all kinds. We save you 50% at least. Levers and Pedals of every description. State just what you require. We probably have it in stock. Guaranteed Spark Plugs 1/2-in. and 3/4-in., 25c.

Dequindre Auto Repair Company,
474 Larned St. E. Detroit, Mich.

AUTO SALVAGE CO.,

1436 Wabash Ave., Chicago

50 H. P. double chain drive trans., \$75; D-4 Bosch magneto, \$45; B. K. Mea Magneto, \$35; D. R. 4 Bosch magneto, \$35; D. U. 4 Bosch Dual magneto, \$35. 1 Model N Ford engine, \$50.00; 50 H. P. Pope-Toledo engine, \$125; 2-cyl. Model F. Buick engine, \$60.00. All Pope-Toledo parts.

BALL AND ROLLER BEARINGS

All types and sizes. We also repair or exchange all makes of ball bearings.

THE GWILLIAM CO., 253 W. 58th St., N. Y.
1314 Arch St., Philadelphia.

AUTO TOPS BUILT AND REPAIRED

Seat covers and body building, remodeling and trimming. Write for prices.

BITLEY TOP & BODY CO.

404-410 Laflin St., Chicago, Ill.

BATTERIES, LIGHTING, IGNITING

Guaranteed standard efficiency. Special 6-70's, \$7.50; 6-80's, \$9.00. Others all prices.

SOLAR STORAGE BATTERY MFRS.

827 East 43rd St. Chicago, Ill.

BIGGEST BARGAIN OF THE SEASON
New 35 H.P. Motors, with Magneto, Carburetor, Starting Crank, \$135. Rear Axles Complete with Transmission, \$65. New Splitdorf Magnetos without coils, \$10. Front and rear Axles Complete, \$30 set. Tool Boxes, \$1.25. Wheels all sizes, \$3. Radiators. Write us for quick service on any car and prices. All mail orders filled promptly. **Michigan Buggy Motors, 40 H.P., \$100.**

NICHOALDS CO.,

424 Grand River Ave., Detroit, Mich.

BODIES, WINDSHIELDS, WHEELS, TIRES

1914 New Ford T Roadster Bodies with tops, \$50 each. Taken off new cars we changed to delivery cars. Open express bodies \$15 up. New windshields, clear vision, \$10. 32-inch solid rubber tires on wheels, only \$12. Slightly used 34x4 detachable tires \$14; tubes \$3; like new and frsts.

Benedict, 63 Winder St., Detroit, Mich.

CHAUFFEURS MEMO PAD

Easily attached to steering wheel, special price, 30c. Adjustable Accelerator Heel Rest, \$1.50. Orders filled promptly. **H. C. RICH, 316 W. 44th St., New York.**

The Clearing House—continued

CLOSING OUT BARGAINS

4½ x 5 "L" head 4-cylinder motors.....\$198.00
30 H. P. chassis less unit power plant... 135.00
30 H. P. right-hand steering gear complete 12.50

G. J. G. MOTOR CAR COMPANY
WHITE PLAINS, N. Y.

COLEMAN'S WATERPROOF FILLER

Will make your auto top waterproof. Guaranteed not to stiffen or change the color. If you cannot obtain Coleman's Filler from your dealer write us direct. Small sample sent by express on receipt of 50 cents. **VIRGINIA WATER-PROOFING CORP., Norfolk, Va.**

Commercial Bodies for Ford Cars
Hand made seat covers for all cars
We clean seat covers

AUTO CAPE TOP CO.,
2334 Michigan Ave., Chicago, Ill.

CUTTING OWNERS AND DEALERS

Note sale of Cutting parts at ridiculous prices:

Fenders Models T-35, A-40, and B-40, each \$2.50.
Radiators A and B-40, \$35.
Radiators T-35 and F-60, \$30.
Radiator hoods, \$3.50.
Transmissions T-35, 8-speed, \$35.
Transmissions A-40 and B-40, 8-speed, \$40.
Cutting 4-speed Warner Transmissions, \$70.
Trunks for A-40, \$9.50.

Lots of other cutting parts at bargain prices.
Send for complete list

AUTOMOBILE APPLIANCE CO.
1436-38 Michigan Ave. Chicago, Ill.

DIRECT FACTORY SALE!

THE WARREN MOTOR CAR COMPANY

are closing out all surplus stock of new auto parts at prices that demand quick sale:

\$ 1.00 Spark plugs.....	\$.19
150.00 full floating rear axle.....	50.00
30.00 front axles.....	12.50
50.00 pressed steel frame—all sizes.....	10.00
100.00 auto bodies.....	80.00
60.00 radiator—many sizes and styles.....	15.00
100.00 magnetos.....	35.00
8.00 iron vises.....	3.19
15.00 electric horns.....	3.98
5.00 complete tool kits.....	1.09
50.00 steering gears.....	12.19
10.00 gasoline tanks—square.....	1.00
18.00 oval and round tanks.....	3.00

Anything else? We have it. Send for a Big Bargain list of new goods being sold at this sale. Get on our mailing list.

Hundreds of other automobile parts and accessories are shown on our Big Bargain Sheet of goods sold at this sale.

WRITE FOR THIS QUICK.

Warren Motor Car Co.,
51 Tenth St.,
DETROIT, MICHIGAN

DISC CLUTCH OIL

Long and exhaustive tests conducted by many leading disc clutch makers have definitely proved that disc clutch oil is superior to any mixture tried.

Nine-tenths of clutch trouble is due to the improper mixture, either too light or too heavy. Send one dollar for a trial can and prove it for yourself. Agents wanted. Address Dept. 10.

TRENT MACHINE CO.,
228 Tyler St., Trenton, New Jersey

Fix Up Your Automobile With Boyer's Air Drying, Glossy Refinisher and Color Finishes—all colors. Write us condition of your car.
BOYER LABORATORY COMPANY
7 West Michigan St., Chicago.

Extremely Special

Double comfortable tufted backs with tufted seats, all upholstered in black leather, \$15.00. Set of five black and nickel lamps, consisting of two gas or electric headlights, two oil or electric side lamps, one oil or electric tail lamp, \$15.00.

G. J. G. Motor Car Company
White Plains, N. Y.

Ford Automobile Specialties

Look for the APCO on the box. If you see this trade mark you are safe in every way, for it means "Every sale a sale of satisfaction." Your money will be cheerfully refunded if you are at all dissatisfied. The APCO goods cost you no more, so insist and don't let your dealer sell you "something just as good" and on which all sales are final. He makes more money, but where do you get off? Remember, if your dealer won't refund your money, we will. You buy APCO and let the other fellow get the imitation. Sold the World Over.

AUTO PARTS CO., Providence, R. I.
The Originators and Largest Manufacturers of Ford Specialties in the World.

Ford Dealers and Owners Attention

I have what you long have been looking for, "THE TANDEM FRONT RADIUS ROD BRACE AND AXLE ALIGNER." No more bent or broken Radius rods; will line up your axle and keep it there, makes your Ford steer easy through sand or mud. Order one now; your money back if not satisfied. Price, \$3.50. Special proposition to dealers.

A. S. HALLS, ORTONVILLE, MINN.

FORD DEALERS

Get our catalogue on commercial bodies for the Ford car.
F. E. LORTZ Co., Chicago, U. S. A.

FORD DELIVERY BODIES

Adapted to every line of business.
Write for our catalog showing our complete line.

Auto Remodeling Co.

1501-5 Michigan Ave.
Chicago, Ill.

Ford, Honeycomb Radiators

This radiator will properly cool any Ford motor and make your Ford a better car. Get our dealers' proposition. Price, \$25.00 f. o. b. Detroit.

DETROIT RADIATOR & SPECIALTY CO.,

965 Woodward Ave., Detroit

FORD OWNERS

Ask your nearest agent for the Stam-Ford Brand of Ford Specialties. None better made.

JOHN B. STAM & CO., MFGRS.
1789 Broadway New York City

FORD OWNERS

Is the bottom of your crank-case oily? Write for our folder describing our spring radius rods which absorb the front axle pound and keeps from loosening the rivets in your crank-case. Saves its cost many times over by saving crank-case leaks.

Folder M on Request

ANGIER'S, STREATOR, ILL., U. S. A.

Ford Owners and Dealers!

The TOWNSAN VALVE ADJUSTER AND SILENCER will silence your valves. You can adjust them quickly. Most all jobbers or address

Townsan Auto Specialty Co.,
Mitchell, South Dakota

FORD OWNERS AND DEALERS!
You will save trouble and money by installing our timer elevating device.

FORD PARTS SPECIALTY CO.,
1211 Main St., Richmond, Ind.

Ford Owners — Purdy Exhaust Horn
for Fords is being used everywhere—positively will not clog or choke. Write today for catalogue. DEALERS, ask for prices.
Purdy Bros. Co., 49 E. 55th St., Chicago

FORD OWNERS

Equip your cars with Seat Covers. Our direct to car-owners plan will save you money. Ten thousand satisfied customers last year.

GLOBE SEAT COVER CO.,
Dept. M, RACINE, WIS.

FORD OWNERS

We can make your car the easiest rider made with light or heavy load; no jolt, no jars, no upthrow. Write us.

Automobile Machine Co., Canisteo, N. Y.

FORD RACING FORD

Write us for racing bodies.
AUTO REMODELING CO.,
1501-5 Michigan Ave., Chicago, Ill.

FORD SEAT COVERS

Made of double texture waterproof cloth, edges leather bound. Cover all upholstery and doors. Price, including top hood, roadster \$9.25; touring car \$14.75. Postpaid.

TRUSCOTT AUTO SUPPLY CO.
St. Joseph, Mich.

FORE DOOR BODIES

1914 Models, five-passenger, fully upholstered; fit most any car. Cost, \$350.00; our price, while they last, \$85.00. Write for full description.

THE M. & M. COMPANY,
480-500 Prospect Ave., Cleveland, Ohio

Fore Doors at Cut Prices

Mr. Auto Owner and Dealer: If your car is without fore doors, write today for bargain prices to reduce stock.

DEPT. D

AUTO SPECIALTY MFG. CO.
326-30 E. Market St., Indianapolis, Ind.

Fore Doors for All Old Models

PRICES RIGHT
F. E. LORTZ CO.,
1332 MICHIGAN AVE. CHICAGO

FOR SALE AT A BARGAIN

New 5x6 four-cylinder, governor controlled engine, fully equipped with carburetor, magneto. Will sell for much less than cost. **FRED HANSON, 570 Prior Ave., St. Paul, Minn.**

FOR SALE—ONE 5 H. P. WESTINGHOUSE MOTOR

Single phase, for either 110 or 220 A. C. This motor is in first class condition. Used only six months. Reasons for selling, now have our own plant on D. C. Price, \$120.00, f. o. b. Quincy, Ill.

J. C. NICHOLS MOTOR CAR CO.
Quincy, Ill.

FOR SALE

Parts for two-cylinder Rambler, Model L Cartercar, 1909-10-11 Chalmers Thirty, less than half catalogue prices. Write us for prices and what you want.

PACIFIC CAR CO.
Tacoma, Wash.

FOR SALE

State or County rights for SUN-LITE Gas. The brightest, cheapest Automobile light in the world. **SUN-LITE GAS CO.,**
135 E. Market St., Indianapolis, Ind.

FOR SALE!

Taxicab body for E-M-F-30 in good condition. For particulars write
CARDER AUTO CO., Kirksville, Mo.

GRIND YOUR OWN CYLINDERS
In your own shop. Save money. Make money. Perfect work. Lowest cost. No rotating of cylinders required on the Acme Grinder. Particulars on request. **ACME GRINDER CO.,**
2740 Humboldt Ave., So. Minneapolis, Minn.

The Clearing House—continued

GET WHAT YOU PAY FOR

Our Hydrometer tells you exactly what grade gasoline you are getting. Sent prepaid, complete with glass jar and case for One Dollar 25,000 sold this year. Send for yours today.

MARSHALL, WALTER & CO.,
Milwaukee, Wisconsin.

LARGEST COMPLETE SUPPLY HOUSE IN THE WORLD

WE WILL MAIL OUT 45,000
BARGAIN SHEETS FREE

Send us your name

F-A-L Chassis assembled.....	\$400.00
Michigan chassis assembled.....	750.00
6-cylinder American underslung motors	200.00
4-cylinder American underslung motors	100.00
Michigan 40 H. P. motors.....	125.00
Briggs magnetos, complete with coil	20.00
Roadster bodies, upholstered.....	60.00
4 and 6' passenger bodies, uphol- stered	100.00
3 Coupe bodies, upholstered and trimmed	175.00
2 Turtle back roadster bodies, up- holstered	75.00
Selective sliding gear transmis- sions	50.00
Cone clutches	20.00

Send for our tire list which allows a discount of 12½%, 10% and 5% off on standard makes.

We have parts for the Michigan 40; F-A-L; Lion 40, and nearly every make of car.

AUTO PARTS CO.

737-739 Jackson Blvd.
Chicago

LEVENE MOTOR CO.

Sole Manufacturers and Distributors of Repair Parts for

Lion Motor Parts Co.,
Louis J. Bergdoll Motor Co.
Midland Motor Co.

We have purchased the entire stock of parts, figs, patterns, drawings, etc., of the above mentioned companies, and are prepared to fill orders for repair parts for all models of these cars; give name and number of cars when ordering parts. Price list on application.

LEVENE MOTOR CO.,

2200-2218 Diamond St.,
Philadelphia, Pennsylvania

MOTOR OWNERS, ATTENTION!

National Oxygen Carbon Remover, fully guaranteed, \$10.00. Don't buy unnecessary attachments; we will let you try this machine thirty days. NATIONAL SALES COMPANY, 210 Midland Building, Kansas City, Mo.

Maxwell Owners and Repairmen

Why pay 20 per cent advance for your parts? We can supply 75 per cent of your wants at the old Maxwell-Briscoe list. Stoddard-Dayton transmission and equalizing gear parts at old list. Why pay more?

SEND FOR PRICE LIST
M. P. SUPPLY COMPANY
Atlanta, Ga.

MICHIGAN, MORA AND DRAGON PARTS

We have maintained the exclusive repair parts business of the Dragon Car since 1907 and on the Mora Car since 1910. We recently purchased the bulk of the stock and all repair parts of the Michigan Cars necessary to maintain the best service in this car also. This stock, together with our unexcelled machine shop equipment, should afford Michigan car owners better service than the makers of the car could give. Our revised price list is now ready for distribution, same will be furnished on application, giving model, style and year of car.

Philadelphia Machine Works
61-71 Laurel Street Philadelphia, Pa.

Original Repair Parts Factory

We furnish repair parts for over 53 models of cars. Own original patterns, tools, etc., including Warren, Elmore, Marquette, Rainier, Welch-Pontiac, Welch-Detroit, F. A. L., Reliable-Dayton, Barnes, De Luxe, Demot, also Michigan, Cutting and many others. Everything for every auto.

Puritan Machine Company,
Detroit, Mich.

Oxy-Acetylene Welding Plant Designs
Blue prints for building and operating complete apparatus at low cost in your shop.
P. O. BOX 77, "DRAFTSMAN,"
Fl. Ward, Wash.

Paint Your Car Yourself

Save \$25 to \$75 by doing the work at home with the Arsenal system. Our big free booklet, "The Car Beautiful," tells how. Send for it today.

Arsenal Varnish Company
Auto Dept. Rock Island, Ill.

PEERLESS LINING DYE

A black non-fading dye to make a uniform black lining out of a faded, grease and water stained lining. Will not fade, wash or rub off. Buy it from your Garage-Dealer-Jobber. One quart for an ordinary five passenger car.

THE COLUMBUS VARNISH CO.
Varnish Mfgs. Columbus, Ohio

Prest-O-Lite Gas Tanks

You save dollars when you buy your gas tank from us. Prest-O-Lite Gas Tanks. Style "B" 40 hour tanks for only \$18. Motorcycle tanks only \$7.70. All tanks filled and complete with all connections. Patent burner-cleaner and nickel-plated key free.

CUT-PRICE GAS TANK SALES CO.
Milwaukee, Wis.

Peerless Mohair Top Dressing

Will make an old top look like new, make a leaking top waterproof, leave the mohair in its natural condition, soft and pliable to fold up and down without cracking the cloth. Buy it from your Garage-Dealer-Jobber. One quart for the top of an ordinary five passenger car.

THE COLUMBUS VARNISH CO.
Varnish Mfgs. Columbus, Ohio

Protect Your Storage Battery

Hydrometer Syringe for testing Storage Batteries and full instructions for care of batteries, \$1.00 postpaid. R. & M. SUPPLY CO., Box 437, Des Moines, Ia.

PEERLESS LAMP ENAMEL

You can finish your lamps, wind-shield rods, etc., a rich gloss or dull finish. Covers solid one coat, and will not crack, chip or peel. Buy it from your Garage-Dealer-Jobber.

THE COLUMBUS VARNISH CO.
Varnish Mfgs. Columbus, Ohio

Radiators

Our Genuine Cellular (commonly called Honeycomb) radiators will properly cool your motor. Each radiator carries with it "a money-back-if-you-want-it-guarantee."

Ford "T".....	\$25.00
Buick 10-24-25-34-35-36.....	27.50
Buick 16-17-19-26-27-28.....	35.00
Buick 21-38-39-43.....	37.50
Cutting 35.....	22.00

5% Discount allowed for cash with order. All orders shipped same day as received.

DETROIT RADIATOR & SPECIALTY CO.
963 Woodward Ave. Detroit

RADIATORS

SMASHED, FROZEN OR INEFFICIENT?
Write **WRIGHT RADIATOR MFG. CO.** and have a better one shipped to you the same day order is received. The only radiator manufacturers who carry in stock hundreds of radiators, all of their own make and guaranteed to be the equal of any radiator made.
WRIGHT RADIATOR MFG. CO.,
8th St., Muskegon, Mich.

RECTIFIERS

To charge from A-C circuit 1 to 5 ignition, lighting or starting batteries at one time; \$12 and upwards. **AMERICAN BATTERY CO.,**
1124 Fulton St., Chicago.

**Repairing Tires with a Maburn Superior
Vulcanizer is Simplicity Itself.**

Write for catalogue
MAPES & BURNS MFG. CO.,
Dept. A. 16 Fulton Ave., Rochester, N. Y.

Repairmen and Garages

If you have a carbon burner we can supply finished equipment so you can use it for welding—at a cost not to exceed \$25.00. Write at once, care Manager,

AUTO WELDING & MFG. CO.
Omaha, Neb.

"SAFETY FIRST"

Most accidents are caused by "cloudy" glass fronts. Our patented glass front cleaner removes rain, snow and "breath-steam" from windshields instantly. Made of brass; cannot rattle; always ready; operates from driver's seat. Send two dollar bill for one today and be safe. Tomorrow you might have accident costing two thousand, maybe life.

MARSHALL, WALTER & CO.
Milwaukee, Wisconsin

SAFETY RADIUS RODS FOR FORDS

Safety Radius Rod and Front Axle Support only device bracing axle direct to frame. Prevents broken and bent radius rods. Takes all strain from crank case. Makes car steer better. Every Ford owner needs one.

MONNICH & ROGERS

Hooper, Nebr.

The Clearing House—continued

Speedometers Speedometers

Special prices to Ford owners for all makes of Speedometers and Parts.

GENERAL SPEEDOMETER REPAIR COMPANY

53 West 63rd St. New York City

STOP THAT LEAK

In your radiator with 1 oz. of Overton's Radiator Leak Compound guaranteed. A lb. can by parcels post prepaid for 50c cash. Prices to dealers. N. L. Overton, 1109 4th Ave., Council Bluffs, Ia.

Peerless Leather Top Dressing

Made with oil to keep soft all leather, rubber and pantosote tops. Dries out of dust in three hours. Leaves a nice gloss finish like a new top. Buy it from your Garage-Dealer-Jobber. One quart for an ordinary five passenger car.

THE COLUMBUS VARNISH CO.

Varnish Mfgs. Columbus, Ohio

"STOP THIEF"

Patented lock for Ford and other small cars. Impossible to start motor. Two keys with each lock. Sent prepaid, \$1.50. May save price of your car. MARSHALL, WALTER & CO., Milwaukee, Wisconsin.

TEST YOUR GASOLINE

Hydrometer complete, glass test tube and carrying case, seventy-five cents postpaid.

R. & M. SUPPLY COMPANY

Box 437, Des Moines, Ia.

That Mysterious Rag Duster

For dusting and polishing automobile bodies, windshields, lamps, pianos or any other polished surface. House Size 25c. Automobile Size 50c. Sent to any address upon receipt of price. If not satisfied, return duster and we will refund purchase price.

THE GEM SUPPLY,

1036 So. Main Street, Waterbury, Conn.

PEERLESS CUSHION DRESSING

Will not wash off or soil light clothes. Dries in twenty minutes. Makes old cushions like new. Buy it from your Garage-Dealer-Jobber. From one pint to a quart for a car.

THE COLUMBUS VARNISH CO.

Varnish Mfgs. Columbus, Ohio

THOMAS CAR OWNERS

Write us about repairs, replacements and new cars.

E. R. Thomas Motor Car Company

1200 Niagara St. Buffalo, N. Y.

Tops Built, Recovered and Repaired

Also top covers, radiator covers, luggage cases, celluloid, etc.

C. G. MEYER & SON, Tiffin, Ohio

Touring, Roadsters, Racing Bodies Seats, special and stock sizes. Radiators, hoods, tanks and fenders for any car. Get our prices.

AUTO SHEET METAL WORKS

1534 Michigan Ave. Chicago, Ill.

USE A DIM-A-LIGHT

Reduces the glare 25 per cent. Simply turning a switch gives you full candlepower of lamp at any moment. Anybody can install it. Pellets' Magneto Exchange, 1606 Michigan Ave., Chicago, Ill.

Warner Speedometers,

With Factory Guarantee, complete, \$20.00. Its Model 30, same as Model 50, sells regularly for more than twice the price. Special price to dealers. 10 per cent with order, subject to examination.

M. & J. Jaffe Co.,

810 N. Sixth St. St. Louis, Mo.

We Make Ford Racing Type Bodies

In several models for immediate delivery

AUTO SHEET METAL WORKS

1532 Michigan Ave. Chicago, Ill.

WE GOT THE F. A. L. AUTO COMPANY

Bought at Auction for Cash.

All service stock, patterns, jigs, tools, dies, blue prints, good will, etc. Everything from the smallest bolt to parts for a complete car.

Will Sell Direct to You

LOOK!

Batteries for lighting.....	\$ 5.50
Frames.....	5.00
Side lamps.....	1.75
Tail lamps.....	1.50
Electric head lamps, pair.....	6.25
Wheels—all sizes.....	3.00
Bodies.....	18.00
Front axles.....	10.00
Weston-Mott rear axles.....	40.00
Spark plugs.....	.19
Tops.....	10.00
Windshields.....	8.19
Transmissions.....	40.00
Hartford Shock Absorbers (set).....	20.00
Rayfield and Fletcher carburetors.....	5.19
Kingston carburetors.....	3.95
2-in. Raybestos brake bands.....	1.25
Mufflers.....	1.50
Model H High Tension K. W. magnetos.....	18.50
Atwater Kent Systems.....	18.50
Springs.....	3.00
Electric Horns.....	2.49

Anything else you want at a price, Get our big catalogue.

Puritan Machine Company,

Detroit, Mich.

All Parts—All Cars

Welding Plants That Are Safe

\$50.00 to \$175.00. Carbon Remover with each welder. Your credit is good with us. The welder pays for itself and you save the mid-dleman's profit. Write for terms. Address Manager, Dept. G.

Bermo Welding Apparatus Company

Omaha, Neb.

We Tear 'Em Up and Sell the Pieces

We want old autos, condition no object. We will buy anything for the auto. We have all kinds of parts, many of them new, at unheard of low prices. Tires and tubes, many new, others used. Kingston carburetors, all sizes; will exchange for others. Gears of all kinds, new gas oval tanks, new timers, magnetos, coil. Stewart speedometers, shafts and chains, tire covers, dust hoods, electric horns, new brass bumpers, lamps, all kinds; Prest-O-Lite tanks, ollers, cylinders, pistons, transmissions, crankshafts, seats and bodies; new 30x3½ wheels, many other used sizes; rims; several chassis without engines; 2-cylinder, 4-cylinder, 6-cylinder engines; springs; in fact, everything that an auto needs. Correspondence solicited. If we do not have it, will advise you where you can get it. Anything bought can be returned at once, unused, carriage prepaid, and we will refund amount paid.

AUTO WRECKING CO.,

Old Church, 13th and Oak

KANSAS CITY, MO.

50 New Pressed Steel Frames

163" long, 24" wide. Each, \$10.

Send for Sketch.

LUCAS & SON, Bridgeport, Conn.

50% ON THE DOLLAR

120 Gal. Bowser gasoline tank; Dalton Adding Machine; 100 new assorted plugs, all makes, 12½c each. STURDY MFG. CO., 2637 Michigan Ave., Chicago.

PORTABLE GARAGES

PRIVATE GARAGES

Galvanized steel or wooden. The finest line offered. If interested write.

Garage Factory, Beaver Springs, Pa.

PARTS AND ACCESSORIES WANTED

WANTED

To Buy Prest-O-Lite Gas Tanks

for cash. Also automobile supplies of all kinds. Please state lowest price you will sell for. I pay cash on delivery.

WALTER R. EBERT

959 34th St., Milwaukee, Wis.

PATENTS & PATENT ATTORNEYS

C. L. Parker, Patent Attorney

Formerly member Examining Corps, U. S. Patent Office. 960 G St., Washington, D. C. Pamphlet of instruction sent upon request.

INVENTIONS EXAMINED

Patent and working drawings made. Models developed and built. Free report as to patentability and cost for development of your invention.

Address Inventions, Dept. A

TOLEDO ENGINEERING AGENCY
Toledo, O.

PATENT YOUR INVENTION. First get our square deal fee plan; free book and free search; \$10,000 offered for one invention wanted. MILO B. STEVENS & CO., 53 W. Jackson Blvd., Chicago. Established 1864. Main Office, Washington.

PATENT YOUR INVENTION THROUGH F. V. WINTERS, M. E. and Patent Lawyer. Thirty years' experience in mechanical and electrical patents. Automobile inventions usually successful. 125 East 23d St., New York City.

RADIATOR AND LAMP REPAIRING

A. A. A. Radiators Manufactured

Any make repaired and returned same day. Radiator to fit any car shipped in 3 days. Sheppard Co., 1331 Jackson Blvd., Chicago

Before Ordering Elsewhere

Get our prices on new radiators, hoods, fenders and tanks. When you have a badly damaged radiator that nobody else can repair, or a radiator that needs a new core, send it to us. All work guaranteed.

Illinois Auto-Sheet Metal Works

58-60 E. 16th St., Chicago, Ill.

Tel. Calumet 1191.

CHICAGO MFG. CO.

1466 Michigan Avenue, Chicago

We are the only radiator manufacturers in Chicago making a square tube radiator. New guaranteed cores placed in old radiators. We also manufacture Hoods, Fenders, Tanks and Pans and do guaranteed repair work. Prompt service.

ONLY RADIATOR FACTORY IN NORTHWEST

Pioneer manufacturer. Why send your radiator down east when you can ship it to us; save time, express, freight, money, and get best workmanship. Prices right. Make new radiators; allow for old one.

TODD MANUFACTURING CO.

820-824 Mary Pl. Minneapolis, Minn.

REBUILDING AND REPAIRING

AUTO SPRINGS REPAIR CO.

We manufacture and repair springs. Proper action compound put in springs.

1331 Jackson Boulevard, Chicago, Ill.

The Clearing House—continued

ANDRE G. CATELAIN

General machine work for foreign and American cars. Welding all kinds of metal. Everready Automatic Engine. Starter Sales and Service.

Manufacturer Catelain Rose Coupling
1446-8 Indiana Avenue Chicago

Carbon Removed From Cylinders
4 cylinders.....\$3.00
8 cylinders.....4.50

ANDRE G. CATELAIN

1446 Indiana Ave. Chicago

CYLINDER GRINDING—The better quality. Perfectly balanced motors guaranteed with our regrounding and new pistons. Scored cylinders filled and reground. Welding repairs of all descriptions. OXY-CARBIDE CO., 398 George Street, New Haven, Conn.

CYLINDER GRINDING

OXY-ACETYLENE

WELDING GEARS

and Parts of Every Description
ADAPT MACHINERY CO.,
1624-32 Wabash Ave., Chicago, Ill.

CYLINDER REBORED

Including piston and rings.....\$7 to \$11
STERLING ENGINE CO.
331 So. Clinton Street Chicago, Ill.

CYLINDERS REBORED AND REGROUND

Fitted With My Light Cast Iron Pistons

40% to 100% lighter than standard, and with my new rings, makes a four run like a six, with a guaranteed gain in efficiency of from 25% to 50%

McCadden Machine Works,
ST. CLOUD, MINN.

CYLINDERS REGROUND

We have special equipment for regrounding cylinders, fitting new pistons and rings. Prices, \$7 to \$15 per cylinder.

Autogenous Welding

Magneto and Battery Work

Prompt Service

BERNHARD & TURNER AUTO CO.
Des Moines, Iowa

CYLINDERS REGROUND

and fitted with new pistons and rings for \$7 to \$11 per cylinder. We do this class of work exclusively and are thus able to give you the highest class of work at these prices.

CROWN MACHINE SHOP

Crown Point, Ind.

FORD

Cylinder Grinding

New Pistons, Rings, Pins

Our special equipment for grinding Ford Model T cylinders enables us to fit new pistons, new rings, and piston pins on short notice. A complete job better than new at prices that will interest Ford dealers as well as owners.

Write at once to

AUTO ENGINE WORKS
St. Paul, Minn.

SCHOOLS

AAAA—COME TO DETROIT. The "Automobile Center," and learn the business in the largest and best equipped school in the country. MICHIGAN STATE AUTO SCHOOL, 11-19 Selden St., Detroit. "The Old Reliable School."

COME TO DETROIT

Learn the Automobile Business
Learn to Be a Machinist
A Complete Repair Course
\$15.00

The Largest College in the State
ROCK'S AUTOMOBILE COLLEGE
256 Cass Ave.,
Detroit, Mich.

LEARN REPAIRING

On every make, driving on dozens of cars, starting and lighting, with largest equipment in America; steam vulcanizing, oxy-acetylene welding and everything known to this business. A \$20 to \$50 course brings you \$1,000 to \$2,500 a year.

Academy of Automobile Engineering,
1452-54 Michigan Ave., Chicago, Ill.

Learn to Earn \$100 to \$200 Per Month

Free booklet, "How to Succeed in the Automobile Business," on application. A Greer diploma guarantees efficiency and protects the life of your employer. Largest motor college in the world—1400 graduates—\$40,000 in modern equipping—eight instructors—100 rebuilding cars—actual work, repairing and driving. Day and evening classes—many owners and dealers employ Greer graduates only.

GREER COLLEGE OF MOTORING
1456 Wabash Ave., Chicago
Opposite Coliseum Phone Calumet 327

STARTING & IGNITION REPAIRING

Starting and Lighting Systems

and storage batteries overhauled and repaired. We charge no more for expert service than other concerns do for novices at the business. Rewinding of all kinds. Established in 1904.

PREMIER ELECT. CO., Not Inc.,
1123 So. Wabash Avenue Chicago
Tel. Wabash 4884.

TIRES

A1 GUARANTEED TIRES

What make do you use? What size?

WRITE FOR OUR PRICE BULLETINS

We pay express charges.

ALLEN S. SINSHEIMER
1503 Michigan Ave. Chicago, Ill.

Auto Tires Recovered as Follows

30 x 3	\$5.80	32 x 3 1/2	\$7.80
30 x 3 1/2	7.20	34 x 4	9.65
36 x 4 1/2	\$12.00		

Non-Skid Treads applied from \$1.00 to \$3.00 extra. Workmanship and material guaranteed. A trial will convince. Repairing tires since 1896.

JUNGKIND & VOGLER

158 Chambers Street, N. Y. City
Branch 1100 Bedford Avenue, Brooklyn, N. Y.

Auto Tires 40 to 65% off All Firsts

Fully guaranteed, all standard makes. We guarantee better quality for same price or same quality for less money. Get our prices before buying. Agents wanted to sell all pertaining to the automobile.

AUTO ECONOMY CO.

1686 Broadway New York

GUARANTEED TIRES DELIVERED DON'T PAY MORE

30x3, \$9.10; 3 1/2, \$12.25; 32, \$13.15; 33x4, \$16.85; 34, \$17.60; 35, \$17.95; 35x4 1/2, \$23.95. All sizes and non-skid. 10 per cent with order for 2 tires; we deliver.

VANDERPOOLS

Springfield, O. Jacksonville, Fla.
Los Angeles, Calif.

I'LL SAVE YOU MONEY

ON TIRES! Dollars saved on every size. Signed guarantee of 3,500 miles with every tire. I'll show you how to make dollars on your old tires, too. Don't buy another tire until you get my illustrated price list. Write me today. It will pay you. State size. J. A. McMANUS, Manager.

PEERLESS TIRE COMPANY,
304T 54th St., West, New York City

I Will Sell You Clincher

or straight side tires, either firsts or seconds, cheaper than anyone in the United States.

D. OGDEN, Columbus, Ind.

Make Two Old Tires

Do the work of a new one. Send us two of your old casings, regardless of their condition, by our process we return you the two tires made into one ready for 2000 miles of actual service. We guarantee this mileage absolutely. We are doing it for others. Send us two old tires today, or write and ASK US HOW.

COWANS BROS.

150 W. 55th St., New York City

RED INNER TUBES

FULLY GUARANTEED FOR 12 MONTHS
30x3, \$2.00; 30x3 1/2, \$2.65; 32, \$2.75; 33x4, \$3.35; 34x4, \$3.40; 35x4, \$3.50.

Send money order or certified check for 2 or more tubes and we prepay express.

Tire Sales Company, Buffalo, N. Y.
Lowest prices on all makes of guaranteed and blemished tires. Send for price list.

SPECIAL FORD TIRES

30x3\$7.50
30x3 1/2 9.00

Guaranteed factory firsts. A wrapped tread tire that cannot be duplicated for the money.

Get our complete tire bulletin on all standard makes.

Consumers Accessories Co.

11 So. Meridian St.
Indianapolis, Ind.

TIRES, HEAVY CAR TYPE

Guaranteed factory-perfect, regular firsts; factory seconds, blemished and repaired tires. Cheaper than any house in the country.

ACME TIRE CO., 296 Broadway, Buffalo, N. Y.

TIRES

Twenty-two years in the rubber business. It is the reputation that counts. Expert tire repairing. The best equipped shop in New York. Manufacturers for U. S. and Canada for the famous Samson Tread. Distributors for all standard makes. Get our prices before buying.

H. PHILLIPS RUBBER WORKS
1989 Broadway, N. Y.

TIRES! FRESH STOCK TIRES!

	New	Used		New	Used
30x3	\$7.25	\$5.50	34x4	\$15.50	\$10.00
30x3 1/2	10.10	7.00	36x4	16.25	10.50
32x3 1/2	10.90	8.00	36x4 1/2	20.25	11.50

All other sizes in proportion. Bargains in new and used tubes.

ACME TIRE & REPAIR CO.,
Phone Calumet 3127. 1547 Mich. Ave., Chicago

The Clearing House—continued

Tires—New, Fresh Stock

Any Size			
28x3	.....\$ 6.80	34x3½	.....\$10.50
30x3	.....7.10	34x4	.....15.00
32x3½	.....10.90	34x4½	.....18.70

All other sizes in proportion.

SERLIN TIRE CO.,

1073 14th Place

Chicago, Ill.

TIRES - TIRES TIRES

SEND FOR OUR NEW CO-OPERATIVE PLAN Our plan shows YOU how to get YOUR tires and tubes

FREE OF CHARGE!!!

8500-Mile PRINTED GUARANTEE of actual service with every tire. Send for YOUR copy. State size you use. Write now—RIGHT NOW.

TUXEDO AUTO TIRE EXCHANGE
896B Eighth Ave., New York City

WELDING

Absolutely Guaranteed Welding

We absolutely guarantee all work done by the OXWELD PROCESS of welding and cutting, including welding cracked or defective cylinders, crankshafts, housings, aluminum crank and transmission cases, etc., etc. Estimates furnished on job and contract welding and cutting of all kinds.

OXWELD ACETYLENE COMPANY
36th St. and Jasper Pl. Chicago, Ill.

Advance Welding Machine Co.
Welding of all kinds of metals. Cast iron and aluminum a specialty.
525 W. Jackson Blvd. 111 N. Desplaines St.
Phones: Monroe 3937; Auto 36-192. Chicago, Ill.

AMERICAN WELDING CO.

2637 Michigan Ave., Chicago
Autogenous welding of all metals, such as crank cases, cylinders, etc. We positively guarantee all work. Tel. Calumet 3563.

AUTOGENEOUS WELDING

Expert welders on automobile parts. Manufacturers of the Galbraith Oxy. Acetylene Welding plants. Get our price and description of a complete welding plant used with oxygen and gas in tanks.

C. SORENSEN,

18 E. 16th St.

Chicago, Ill.

BROKEN CRANKSHAFTS

Crankcases, cylinders, flywheels, gear-teeth, pistons perfectly welded and machined, ready to replace. Scored cylinders made new. Booklet.

ATLAS WELDING WORKS,

Rahway, N. J.

WELDING

Cylinder crankcase and crankshaft welded. Cylinders rebored, \$7 to \$11 a cylinder, including piston, 8 rings.

STERLING ENGINE COMPANY
331-333 S. Clinton Street Chicago, Ill.

OXY-ACETYLENE WELDING

Cast Iron, Steel and Aluminum, etc. Cylinders, Crankcases and crankshafts a specialty. Engines, transmissions, etc., overhauled. Cylinders rebored with new piston and rings, \$7 up.

COMET MOTOR WORKS,

564 Jackson Blvd.

Chicago

WANTED---AGENTS & SALESMEN

Exclusive and Side Line Salesmen for spark plugs and accessories. Well established. Good chance for right man.

STURDY MFG. CO.

2637 Michigan Ave.

Chicago

WANTED AGENCIES

WANTED

State agencies for new patent automobile accessory. Sell to every automobile owner. Chance for live salesman to make money. Address Box 85, Muncie, Ind.

MISCELLANEOUS

We Are Constantly in Touch

with employers requiring High-Grade Engineering service. Are you listed with the

TOLEDO ENGINEERING AGENCY
Toledo, Ohio



SPROCKETS

Chains and Differential
IN STOCK OR ORDER

SEND FOR NEW CATALOG

CULLMAN WHEEL COMPANY

1341 Altgeld Street

Chicago

IF YOU TRY ONE YOU WILL WANT MORE
Critchley's Expanding Reamer



Reams
Odd-Sized
Holes

CHADWICK & TREFETHEN,

PORTSMOUTH, N. H.

BOILERS

FOR STANLEY STEAM CARS. Also Grout, Prescott, Locomobile and Mobile Boilers, all guaranteed to fit. Special boilers 4 to 60 h. p.; repair work.

Steam Carriage Boiler Co., Oswego, N. Y.

MARMON

"The Easiest Riding Car In The World"

Marmon "48"

Six Cylinders

\$5000

Marmon "41"

Six Cylinders

\$3250

Marmon "32"

Four Cylinders

\$3000

Nordyke & Marmon Co.

Indianapolis (Est 1851) Indiana

Over Sixty Years of Successful Manufacturing

The Automobile HAND BOOK

NEW EDITION

By L. ELLIOTT BROOKES

Assisted by Other Well Known Experts

PRICE, \$2.00

(41)

The Class Journal Co., 910 S. Michigan Ave., Chicago

Hoyt Electrical Instrument Works

Makers of

**HOYT AMMETERS
AND VOLTMETERS**

Penacook,

New Hampshire

SUPPLIES

Dealers, send for our 1914 catalogue, just out. New goods, new prices, prompt shipments. A few Fisk casings, 36x4, Q. D. Clincher Heavy Car Type, at reduced prices, while they last.

CHICAGO AUTOMOBILE SUPPLY HOUSE
1355 S. Michigan Blvd., Chicago, Ill.

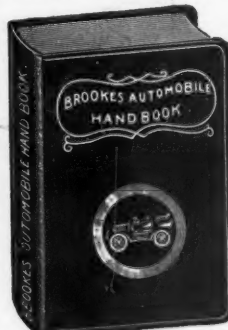
New Edition—

The Automobile HAND BOOK

By L. ELLIOTT BROOKES

Assisted by Other Well Known Experts

Revised and Enlarged New Edition—The largest and most practical work published—Used by all up-to-date automobile schools as their every-day textbook. 700 pages and over 320 illustrations. Full Leather Limp, Round Corners, Red Edges.



PRICE, \$2.00

THE CLASS JOURNAL CO.

910 S. Michigan Ave. Chicago

(39)

Classified Advertising

Rate 25¢ a Line

Cars For Sale

A BARGAIN—UNUSED FOUR CYLINDER ton and a half truck held by bank. Will sell for \$1,200.00 cash. Address Union National Bank, Muncie, Ind.

FOR SALE CHEAP! A SIX CYLINDER Stevens Duryea Car all in good running order; 4 new tires and inner tubes. Inquire at 37 Hanover St., Portland, Maine.

MODEL F 7-PASSENGER STODDARD- Dayton. Perfect condition, except tires. \$450. A guaranteed bargain. F. E. Alford, Goshen, Ind.

RACE CAR 281 CUBIC INCH. 85 MILES per hour. Cheap, cash or time. Sheridan, 3306 Park Ave. Indianapolis, Ind.

FOR SALE—POPE HARTFORD FIVE-PAS- senger four-cylinder 50 H. P., cost \$3,200.00; looks good as new; good running condition; four doors; 1912 model, \$1,400; cash to quick buyer. W. O. Knapp, 924 W. Broad St., Richmond, Va.

Parts and Accessories

FOR SALE

FOR SALE—28-HORSEPOWER 4-CYCLE "Campbell" marine motor; used one month only. Address, P. M. Peterson, Stanchfield, Minn.

ONE FOUR CYLINDER 40 H.P. POPE TO- ledo engine with coils and carburetor, \$100. One double chain drive transmission for same, \$35. One E.M.F. 30, just overhauled and painted, five passengers, \$600. William L. Redmon, Tipton, Mo.

1 35 H.P. MOTOR D.C.; 1 7½ H.P. MOTOR d.c. Grand Rapids Pearl Button Co., 232 Lyon street, Grand Rapids, Mich.

20 PASSENGER SIGHT-SEEING BODY— Very cheap. E. E. Behr, 750 30th St., Milwaukee, Wis.

Parts and Accessories

WANTED

WANTED TO BUY A SEVEN PASSEN- ger or more bodies, or limousine new or second hand, and some three passenger seats. Merritt & Wills, San Marcos, Texas.

For Sale or Exchange

FOR SALE OR TRADE—ONE MODEL S Ford motor, wheels, transmission, body, fender, tires, front axle, radiator and small parts for 9 H. P. motorcycle. Frank Hiday, 1909 Holloway Ave., Indianapolis, Ind.

FOR EXCHANGE OR SALE
A fully equipped garage in a live city of twelve thousand people. Does business twelve months in the year. Will consider stock merchandise, houses or business property. Price, \$9,000. Homer W. Wright, Sullivan, Illinois.

FOR SALE OR EXCHANGE—ONE TWEN- ty-five foot motor boat, with four-cylinder engine, for runabout or roadster such as Overland, etc.; will consider one that needs overhauling, but no junk. Boat in A1 condition, but cannot use same; full particulars on request. E. E. Keller, Box 456, Eddyville, Iowa.

Help Wanted

SALESMEN, PATENTED AUTO INSPEC- tion light, cigar lighter on dash, with concealed spring reel, ten feet silk cord attached, any voltage, complete \$6.00. H. C. Currier Sales Co., Minneapolis, Minn.

WANTED—FIRST CLASS EXPERIENCED Franklin repair man; good pay and steady work. Southern California. Address, Box E 108, c/o Motor Age.

WANTED—THERE IS AN OPPORTUNITY in the sales force of a prominent automobile company for one or two highly efficient wholesale salesmen. Only men of the highest class, experience and producing qualities are desired. Address Box E 99, c/o Motor Age.

WANTED—A NO. 1 SALESMEN TO SELL the M-E Oxygen Generator, latest device for generating Oxygen Gas for cleaning Engine Cylinders and Oxygen-Acetylene Welding. Big seller, good profit; territory going fast. Write at once. Fisher, Richards & Todd, Hazleton, Pa.

Situations Wanted

POSITION WANTED AS CHAUFFEUR, 8 years' experi.; 32 yrs old; married; German-American; do own repairs; careful driver; never had accident. Box E 107, c/o Motor Age.

Business Opportunities

FOR SALE—GARAGE AND COMPLETELY equipped machine shop, building, ground and tools, for \$3,400; no trades. For particulars write Jos. Slagel, Fairbury, Ill.

FOR SALE—GARAGE IN CITY 10,000. Leading car agencies; machine shop fully equipped; also Ford agency; one other shop in city; large storing capacity. Address Box E 95, care Motor Age.

FOR SALE. GARAGE AND REPAIR SHOP 100x40 ft. Will sell with or without building. Good reason for selling. Don't answer unless you have money. Address Box E 92, Motor Age.

FOR SALE—ONE OF THE BEST LOCA- tions for Garage and Sales Room in Ohio. Building two story, 175x45, over 15,000 sq. ft. of floor space. Ford Agency, large Auto Livery and Accessory business; no better opportunity ever offered. Address Box E 101, c/o Motor Age, Chicago, Ill.

HAVE A GOOD PROPOSITION TO OFFER to some Automobile Manufacturer needing more room or additional capital and willing to move. Write promptly, giving details of your requirements and present business. Box E 104, c/o Motor Age.

WANTED—MECHANICS THAT CAN IN- vest \$20,000 in a strictly first class manufacturing plant building a line of commercial wagons and auto trucks. A co-operative company is desired. Business is well established and orders ahead. Only high class mechanics wanted. Address Box E 100, c/o Motor Age.

WE HAVE AN OPENING FOR A COMPE- tent factory manager in moderate sized plant making medium priced automobiles. One having some capital to invest preferred. Address, Box E 103, c/o Motor Age.

Miscellaneous

LOW RENT ON AUTO ROW, CHICAGO. Will sublet cheap, all or part 1,500 ft., second floor; new, high-class building. Advertising privileges, large front plate glass window facing Michigan Blvd. Also private office or desk space. Tanner Mfg. Company, 2011 Michigan Blvd.

WANTED—THE ADVERTISEMENTS OF of those men who believe in themselves and their ability to "do something." If you are a salesman, demonstrator or repairman for motor cars—a man of ability—and desire to make a change, it will pay you well to insert an ad under "Situations Wanted" on this page. Mr. Employer, if you want a good man, it will pay you to watch these columns.

MOTOR AGE is read by more than 23,000 owners of motor cars, garages and repair shops, motor car dealers, etc., **every week**. These people read MOTOR AGE **every week** because they are intensely interested in motor cars—they read it to keep in touch with "what's what and who's who" in motordom. Do these 23,000 and more people read the **Classified Advertisements**? Please note the following:

Business Opportunity

YOU WILL PLEASE CANCEL OUR ORDER for classified ad of the 29th. The two insertions were enough. We sold the plant today, and MOTOR AGE did it. We ran the ad in four other publications and did not get as many inquiries from all four as we got from MOTOR AGE, and we are still getting replies.

Situation Wanted

KINDLY CHANGE MY ADDRESS FROM Odebolt, Iowa, to Jonesboro, Ark. It is a good thing for me that I did not have you run my ad for six weeks, as the two insertions got replies enough so I thought I would be broke buying postage to answer them. Have a good job here, obtained through the ad.

Can anything be more convincing that classified advertising in MOTOR AGE Pays?



For unaffected accuracy during the hot months of summer the **centrifugal** principle is an essential in speedometer construction. Exhaustive tests in government laboratories and actual road-service have proved it.

Aside from the correctness of its **centrifugal** principle, there are other reasons for equipping with a



SPEEDOMETER

"The Speedometer of Absolute Accuracy"

The simplicity of its parts insures the utmost in strength and durability. The Corbin-Brown flexible shafting—an exclusive feature—is a further insurance against wear and breakage. Strong, solid links give a smooth bearing, thus minimizing friction and affording smooth running.

Furthermore, the Corbin-Brown Speedometer is made by a concern which for more than 40 years has held the high regard of manufacturer and consumer alike. Its reputation for thorough workmanship and high quality material is well established. The Corbin-Brown Speedometer is backed by a guarantee of one full year of service.

Write today for catalog

The Corbin Screw Corporation

THE AMERICAN HARDWARE CORPORATION,
Successors

New Britain, Conn.

BRANCHES: New York Chicago Philadelphia

Index to the

A

Acme Torsion Spring Co... 101
Adamson Mfg. Co..... 106
Alma Motor Truck Co..... 105
Atwater Kent Mfg. Works. 102
Automobile Trade Directory68-69

B

Bartholomew Co..... 89
Benham Mfg. Co..... 104
Bosch Magneto Co..... 3
Braender Rubber & Tire Co. 108
Brennan Motor Mfg. Co... 105
Brietson Mfg. Co..... 59
Bridgeport Brass Co..... 109
Briggs-Detroit Co..... 109
Broderick & Bascom Rope Co. 99
Brown Co..... 101
Buda Co..... 90
Byrne, Kingston & Co..... 106

C

Cartercar Co..... 109
Chadwick & Trefethan.... 116
Chandler Motor Car Co...54-55
Chaney, L. F., Co..... 104
Chicago Automobile Supply House 116
Classified 117
Clearing House.....110 to 116
Cole Motor Car Co..... 107
Connecticut Tel. & Elec. Co.52-53, 103
Continental Motor Mfg. Co. 105
Convertible Auto Body Corporation 94
Corbin-Brown Speedometer. 118
Coreoran Lamp Co..... 102
Cox Brass Mfg. Co..... 106
Crary Co..... 103
Cullman Wheel Co..... 116
Cutler-Hammer Mfg. Co...50-51

D

Dann Oil Cushion Spring Insert Co..... 45
Dayton Rubber Mfg. Co.... 109
Detroit Steel Products Co.. 104
Duff Mfg. Co.....Back Cover

E

Eagle Oil & Supply Co..... 87
Eisemann Magneto Co..... 72
Empire Automobile Co..... 106
Englebert Tyre Co..... 89
Essenkay Products Co..... 105

F

Fedders Mfg. Co..... 105
Firestone Tire & Rubber Co. 105
Ford Motor Co..... 98
Forest City Elec. Co..... 96
France Mfg. Co..... 87

G

Gabriel Horn Mfg. Co..... 91
General Motors Truck Co.. 73
Gilbert Mfg. Co..... 119
Golden, Belknap & Swartz Co. 107
Goodrich, B. F., Co.....64-65
Gould Storage Battery Co.. 92

H

Ham, C. T., Mfg. Co..... 105
Hartford Suspension Co.... 2
Hassler, R. H..... 100
Haynes Automobile Co..... 109
Haywood Tire & Equipment Co. 94
Herz & Co..... 99
Holley Bros. Co..... 80
Hotel McAlpin..... 93
Houk Mfg. Co..... 102
Hoyt Electrical Instrument Works 116
Hupp Motor Car Co..... 104
Hyatt Roller Bearing Co... 104

I

Inter-State Motor Co..... 108

J

Jeffery, Thos. B., Co.....84-85
Jiffy Auto Curtain Co..... 75
Jones Electric Starter Co... 102

K

K-W Ignition Co..... 76
Kimball Tire Case Co..... 107
Kissel Motor Car Co..... 107
Knox Automobile Co..... 107

Advertisements

L

Laidlaw Co.....	67
Leece-Neville Co.....	105
Lee Tire & Rubber Co.....	92
Lexington-Howard Co.....	104
Lincoln Highway Assn.....	100
Lovell-McConnell Mfg. Co..	47

M

McCadden Machine Wks....	93
Manzel Bros. Co.....	90
Maxwell Motor Co.....	79
Mayo Mfg. Co.....	98
Mercer Automobile Co.....	108
Metal Specialties Co.....	119
Meteor Motor Car Co.....	56-57
Metz Co.....	108
Moline Automobile Co.....	107
Mosler, A. B., & Co.....	70-71
Motsinger Device Mfg. Co..	101

N

National Motor Veh. Co....	1
New Departure Mfg. Co....	91
New Lite Mfg. Co.....	86
N. Y. & N. J. Lubricant Co.	102
Nordyke & Marmon Co.....	116

O

Owego Car Co.....	97
Oxygen Decarbonizer Co...	107

P

Packard Electric Co.....	48
Paige-Detroit Motor Car Co.	108
Pederson Lubricator Co....	99
Pennsylvania Rubber Co...	62
Premier Motor Mfg. Co...	60-61
Prest-O-Lite Co.....	83

R

Remy Electric Co.....	100
Reo Motor Car Co.....	82
Republic Rubber Co.....	106
Richard Auto Mfg. Co.....	109
Rutenber Motor Co.....	104

S

Salisbury Wheel & Mfg. Co.	102
Saxon Motor Co.....	74
Schaefer Sales Corp.....	81
Schrader's, A., Son.....	101
Searchlight Gas Co.....	108
Shaler, C. A., Co.....	78
Sheldon Axle Co.....	106
Spicer Mfg. Co.....	104
Splitdorf Electrical Co....	100
Standard Oil Co.....	106
Standard Woven Fabric Co.	.....Cover
Star Ball Retainer Co.....	102
Steam Carriage Boiler Co..	116
Stewart-Warner Speedometer Corp.	58-63
Stromberg Motor Devices Co.	108

T

Troy Wagon Works Co....	103
Tuthill Spring Co.....	95
Twitchell Gauge Co.....	107

V

V-Ray Co.....	98
Vulcan Mfg. Co.....	103

W

Walker-Moore Co.....	95
Ward Leonard Electric Co..	108
Warner Gear Co.....	99
Weed Chain Tire Grip Co...	120
Westcott Motor Co.....	86
Western Elec. Co.....	103
Weston Electrical Inst. Co..	96
Wheeler & Schebler.....	46
White, The, Co.....	4
Whitney Mfg. Co.....	98
Wiard Automatic Air Valve Co.	97
Willard Storage Battery Co.	49
Wills Chemical Co.....	96
Willys-Overland Co.....	Cover
Winton Motor Car Co.....	109
Wisconsin Motor Mfg. Co...	106
Wizard Motor Co.....	109
Wood Mfg. Co.....	102

Z

Zenith Carburetor Co.....	77
---------------------------	----

GILBERT NECESSITIES



The up-to-date use of wire wheels has brought the up-to-date Wire Wheel Cover. GILBERT quality is supreme and GILBERT prices are nominal.

We also make an exceptionally fine line of Inner Tube Bags and Cases of fleece-lined rubber and other materials, leather magneto Covers, Steering

Knuckle and Universal Joint Boots and many other highly necessary articles made almost exclusively by us.

Our interesting catalog for 1914 contains a large number of surprisingly handy, useful and necessary articles, all at the right price and all the best that can be made. Get our booklet, but, above all, when buying accessories of the kind we make, insist on GILBERT quality.

THE GILBERT MFG. COMPANY
New Haven, Conn.



"PRESTO"

Combination Inspection Lamp, Cigar Lighter and Automatic Cord Winder

No. 250. Three conveniences combined in one. An electric cigar lighter, a repair lamp, an acetylene lamp lighter. Ample length of cord enables device to be carried anywhere about the car. Furnished with Holder, which can be placed on dash, in the tonneau or anywhere you will. The Automatic Cord Winder, automatically winds up the lamp or cigar lighter cord. Cigar Lighter is guaranteed pure platinum wire which guarantees permanency of service. Gets its power direct from battery. Adapted for use for 6, 7, 8 or 12-volt batteries. In ordering state battery voltage. Outfit complete with 6-volt Lighter Tip, \$6.00. 7 or 8 volt Lighter Tip, 25c extra. 12-volt Lighter Tip, 50c extra.

Order by number through your dealer or direct

Beware of imitations which do not use Pure Platinum Tips.

METAL SPECIALTIES MFG. COMPANY

736-738
W. Monroe St.
CHICAGO, ILL.





A VISION
of your car,
disastrously skidding
on the slippery turn ahead—

You have neglected to put on Weed Chains. **You** anxiously view the slippery turn ahead and have a *mental picture of your car skidding into the school children.*

Stop nursing anxiety and coaxing calamity. For Safety's sake —for your own peace of mind fully equip your car today with

Weed Anti-Skid Chains

The Only Real Safeguard Against Skidding

Safety demands that all tires be equipped with Weed Chains. It doesn't require the gift of second sight to see why this is true. **Rubber slips—never grips.** Rubber will agree to anything the road has to offer. It is the weaker element. It slides on wet pavements like a cake of soap rubbed on the moistened hands. Rubber lacks the bite-and-hang-on ability to prevent skidding.

Weed Chains are attached without any jacks. You lay the chain over the wheel, with the hooks at the rear. Tuck the slack end under the front of the wheel. Run the car forward until the wheel clears the end on the ground. Draw the chains together, hook the hooks in the end links and *the thing is done.*

Weed Chains are diamond hard—many times harder than their opposing element the pavement or road. Wheels equipped with Weed Chains automatically lay their own traction surface. Friction is effected without affecting the tires. They grip without grinding—hold without binding. **No matter how muddy or icy the road,** they hold on like a bull dog, prevent side-skid and drive-slip.

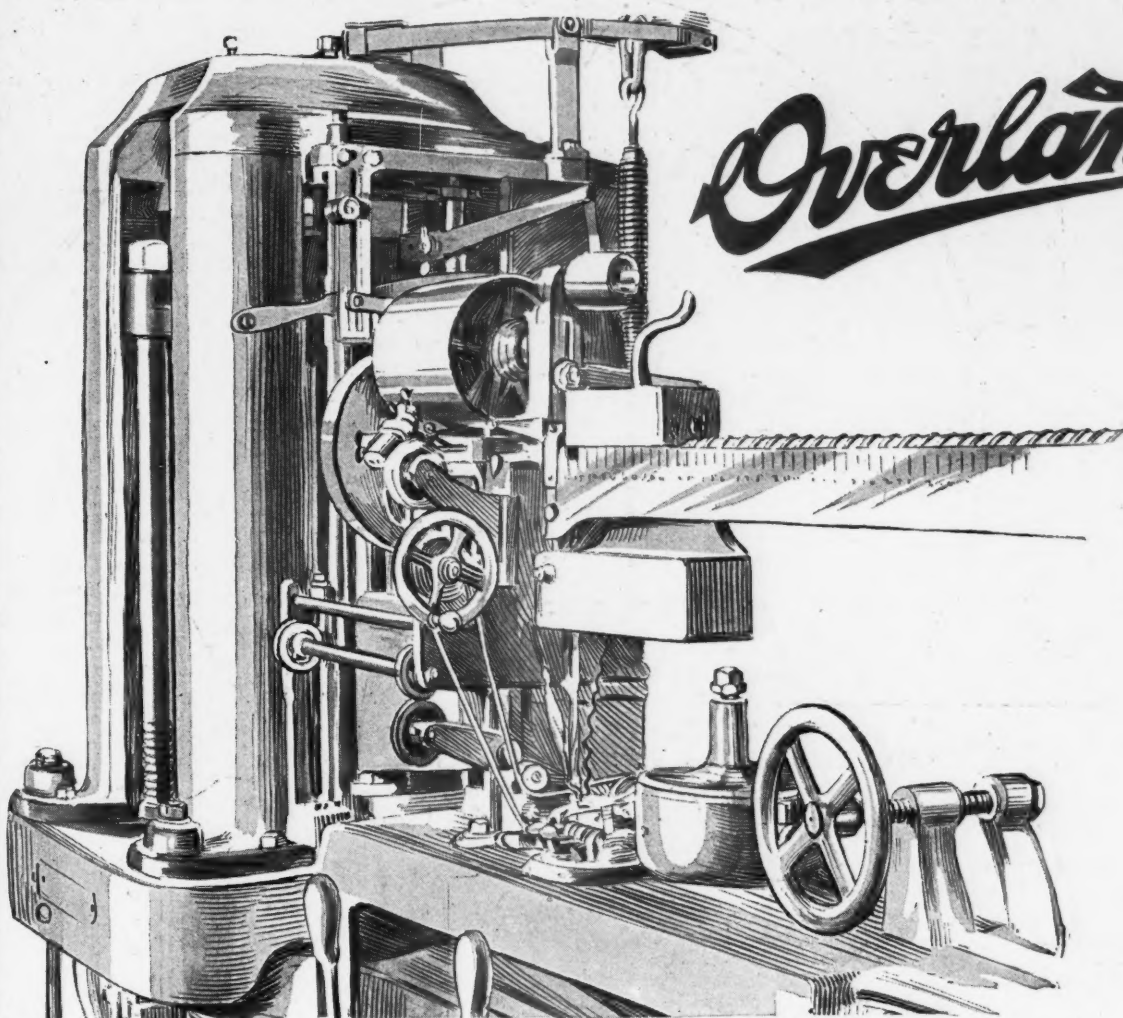
Sold for ALL Tires by Dealers Everywhere



Weed Chain Tire Grip Co.
Bridgeport, Connecticut

Manufactured for Canada by
DOMINION CHAIN COMPANY, Limited—Head Office: Shaughnessy Bldg., Montreal, Canada





A 100,000-Pound Test of Overland Materials

WE do not take the manufacturer's word as to the strength or quality of Overland steels. Though most steel manufacturers are perfectly reliable, we go to the most extreme lengths to insure durability and safety in all Overland parts.

The Olsen tensile strength testing machine shown above, exerts a power for crushing or pulling, as desired, of 100,000 pounds, or 50 tons to the square inch. A sample of every shipment of steel we buy is tested in the machine,

to determine its quality and strength. If the sample pulls apart or crushes at a lower pressure than our specifications require, the whole shipment is rejected as unfit.

This is one of the reasons why the Overland is the best car in the world at anywhere near its price. Another reason is that every part of the car is subjected to similar tests.

Write for our catalogues and literature telling more of Overland quality. Please address Dept 46.

\$950

*Completely
Equipped*

f. o. b. Toledo

The Willys-Overland Company

Toledo, Ohio

*Manufacturers of the famous Overland Delivery Wagons, Garford and
Willys-Utility Trucks. Full information on request*

\$1075

*With electric
starter and
generator*

f. o. b. Toledo



No. 345

For light and medium light cars like the Ford, Buick, Overland, Studebaker, Maxwell, King and others. Malleable iron base. Height 11 ins. Weight 7 pounds.

Duff Advice to Ford Owners

—and to all owners
of light weight cars

DON'T waste time and temper tinkering with a toy jack. Scrap it and forget it— and invest the small price of a No. 345 Barrett—fully guaranteed.

Barrett reliability, safety, speed and ease of action mean just as much to light cars as they do to heavy types, and the Barrett No. 345 is the same relative standard as the bigger Barrett No. 300—the finest and most powerful jack made for large pleasure cars.

BARRETT AUTOMOBILE JACKS

A Clincher
in Jack Sales—

Duff Guaranteed Construction

Duff guaranteed construction, that assures the highest degree of safety and efficiency for every genuine Duff built Barrett Automobile Jack, is a new element in Duff service to automobile supply dealers. Any unsatisfactory jack is repaired or replaced free of charge within one year.

No other make of jack offers the dealer such a definite protection against complaints from customers; or the user such a broad and definite expectation of operative satisfaction.

Duff built means Duff backed—unconditionally. The Duff standard means highest quality of material, perfection of design, precision of finish and assembling, and thorough testing under full load before delivery.

Dealers should write at once for the Duff proposition. To carry Duff built Barrett Automobile Jacks is to become identified with the most desirable class of trade, and to share in the great volume of Barrett business. Inquiries will be given prompt and complete attention.

The Duff Manufacturing Co., Pittsburgh, Pa.

ESTABLISHED 1883

New York, 50 Church Street
Atlanta, Candler Bldg.

Chicago, People's Gas Bldg.
San Francisco, Monadnock Bldg.

Foreign Distributors

London, N. W. European Continent—ARMAND D. RIVIERE et CIE., Paris, France



No. 300

For any six-cylinder car, such as the Pierce-Arrow, Packard, Oldsmobile, White, Marmon, Stevens-Duryea, Locomobile, etc. Has adjustable Foot Lift and machine cut steel gears, making operation very easy. Height 11 3/4 ins. Weight 13 pounds.